資　　料

資料１　調査団員・氏名

ケニア共和国
アティ橋・イクサ橋架け替え計画基本設計調査

1-1　本格調査時

氏名	**担当**	**所属**
1 福若雅一	総括	国際協力事業団　国際協力専門員
2 坂部英孝	計画管理	国際協力事業団　無償資金協力部
3 久保谷伸博	業務主任／道路交通計画	㈱オリエンタルコンサルタンツ
4 大野忠夫	橋梁設計	㈱オリエンタルコンサルタンツ
5 小島次郎	自然条件調査Ⅰ（測量・地質）	㈱オリエンタルコンサルタンツ
6 岡部信之＊	自然条件調査Ⅱ（水文）	㈱オリエンタルコンサルタンツ
7 柳川春夫	施工計画／積算	㈱日本構造橋梁研究所

＊：日本技術開発株式会社より補強

1-2　基本設計概要説明時

氏名	**担当**	**所属**
1 成瀬　猛	総括	国際協力事業団　ケニア事務所
2 坂部英孝	計画管理	国際協力事業団　無償資金協力部
3 久保谷伸博	業務主任／道路交通計画	㈱オリエンタルコンサルタンツ
4 大野忠夫	橋梁設計	㈱オリエンタルコンサルタンツ

資料2-1 調査行程　　ケニア国アティ橋・イクサ橋架け替え計画　基本設計調査現地調査行程

			官団員		コンサルタント団員				
No	日付	曜日	福若	坂部	久保谷	大野	岡部	柳川	小島
1	2/10	土		12:40 成田(BA008)→16:35 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ	22:25 ﾛﾝﾄﾞﾝｶﾞﾄｳｨｯｸ(BA2069)→				
2	11	日		→10:00 ﾅｲﾛﾋﾞ(BA2069)　団内協議					
3	12	月		JICA事務所、日本大使館表敬訪問及び打合せ　MORPW 表敬					
4	13	火		IC／P説明・協議、ミニッツ協議					
5	14	水		ミニッツ協議			資料収集		
6	15	木	ﾅｲﾛﾋﾞ到着	団内打合せ					
7	16	金	現地調査（アティ橋、イクサ橋、B7号線）						
8	17	土	現地調査（B7号線）						
9	18	日	現地調査まとめ及び団内打合せ						
10	19	月	現地調査結果報告及びミニッツ協議						
11	20	火	ミニッツ協議						
12	21	水	JICA事務所への報告　ミニッツ署名、大使館報告				資料収集		
			23:00 ﾅｲﾛﾋﾞ(BA2068)		資料収集				
13	22	木	12:00 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ(BA005)		資料収集		資料収集		
14	23	金	8:45 成田着		資料収集		現地調査	資料収集	現地調査
15	24	土			団内協議				
16	25	日			資料収集		資料収集及び整理		現地調査
17	26	月			資料収集及び整理			現地調査	現地調査
18	27	火			資料収集及び整理			現地調査	現地調査
19	28	水			資料収集及び整理			現地調査	現地調査
20	3/1	木			資料収集及び整理		現地調査	現地調査	現地調査
21	2	金			日本大使館説明		資料整理	資料整理	現地調査
22	3	土			資料収集及び整理				現地調査
23	4	日			資料収集及び整理				現地調査
24	5	月			資料収集及び整理				現地調査
25	6	火			現地調査				現地調査
26	7	水			現地調査	資料整理	現地調査	資料整理	現地調査
27	8	木			団内協議				現地調査
28	9	金			資料収集及び整理		23:00BA2068→	資料整理	現地調査
29	10	土			資料収集及び整理		4:55 ﾛﾝﾄﾞﾝ　12:00 ﾋｰｽﾛｰ(BA005)	資料整理	現地調査
30	11	日			資料収集及び整理		8:45 成田	資料収集・整理	現地調査
31	12	月			MORPW 協議			MORPW 協議	現地調査
32	13	火			MORPW 協議			資料収集・整理	現地調査
33	14	水			MORPW 協議			MORPW 協議	現地調査
34	15	木			MORPW 協議			資料収集・整理	現地調査
35	16	金			MORPW 協議			MORPW 協議	現地調査
36	17	土			資料収集及び整理			資料収集・整理	資料整理
37	18	日			団内協議			団内協議	
38	19	月			JICA 説明　MORPW 説明・協議　23:00 ﾅｲﾛﾋﾞ(BA2068)			JICA 説明　MORPW 説明・協議　23:00 ﾅｲﾛﾋﾞ(BA2068)	
39	20	火			4:55 ﾛﾝﾄﾞﾝｶﾞﾄｳｨｯｸ(BA2068) 12:00 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ(BA005)			4:55 ﾛﾝﾄﾞﾝｶﾞﾄｳｨｯｸ(BA2068) 12:00 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ(BA005)	
40	21	水			8:45 成田			8:45 成田	

資料2-2 調査行程　　ケニア国アティ橋・イクサ橋架け替え計画　基本設計概要説明調査行程

			官団員		コンサルタント団員	
No	日付	曜日	成瀬	坂部	久保谷	大野
1	7/20	水			12:40 成田(BA008)→16:35 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ 22:25 ﾛﾝﾄﾞﾝｶﾞﾄｳｨｯｸ(BA2069)→	
2	21	木	団内協議	→10:00 ﾅｲﾛﾋﾞ(BA2069) JICA事務所表敬訪問 団内協議	→10:00 ﾅｲﾛﾋﾞ(BA2069) JICA事務所表敬訪問 団内協議	
3	22	金	MORPW, MOFP 表敬訪問、基本設計概要書説明協議			
4	23	土		団内協議、資料作成		
5	24	日		書類整理	現地調査	
6	25	月	MORPW 説明・協議			
7	26	火	MORPW 説明・ミニッツ協議			
8	27	水	MORPW ミニッツ調印 JICA 報告、大使館報告	MORPW ミニッツ調印 JICA 報告、大使館報告 23:00 ﾅｲﾛﾋﾞ(BA2068) →		
9	28	木		→4:55 ﾛﾝﾄﾞﾝｶﾞﾄｳｨｯｸ(BA2068) → 12:00 ﾛﾝﾄﾞﾝﾋｰｽﾛｰ(BA005)		
10	29	金		→ 8:45 成田		

資料３　関係者（面会者）リスト

◆道路公共事業省（Ministry of Roads and Public Works）

1. Eng. E.K. Mwongera	Permanent Secretary
2. Eng. E.K. Wambura	Engineer of Chief

◆　道路公共事業省 道路局（Road Department, MOR&PW）

3. Eng. P. Wakori	Chief Superintending Engineer (Chief Engineer Road)
4. Eng. M.O.A. Bajaber	Chief Superintending Engineer (Bridge)
5. Eng. J. N. Nkandayo	Chief Superintending Engineer (T/R)
6. Eng. H. Kiragu	Engineer (Bridge)
7. Eng. C. W. Moria	Engineer (Bridge)
8.徳永剛平	JICA Expert (Bridge)

◆財務計画省（Ministry of Finance and Planning）

9. Mr. J. K. Kanithi	Under Secretary (External Resources Department)

◆キツイ地区道路行政事務所（DWO：District Works Office-Kitui-）

10. Hon. Samuel Penitala Teo	Minister
11. Mr. Lotoala Meita,	Secretary

◆環境資源省（Ministry of Environment and Natural Resources）

12. Mr. C.B.K. Mbugua	Water Resources Database,
13. Mr. Muikia D.M.,	Senior Hydrologist,

◆在ケニア日本大使館

14. 青木盛久　大使
15. 松宮洋介　一等書記官

◆在ケニアＪＩＣＡ事務所

16.橋本栄治　所長
17.吉徳光男　所員

◆NGO 関係者

18. Mrs. Monicah MUTAMBUKI	Project Coordinator AA (Action Aid), Kibwezi
19. Mr. Peter G. Karinge	Project Coordinator ARDA, Ikutha (Adventist Development and Relief Agency)

資料　4　ケニア国の社会・経済事情

国　名	ケニア共和国
	Republic of Kenya

一般指標					
政体	共和制	*1	首都	ナイロビ(Nairobi)	*2
元首	大統領／ダニエル・トロイティッチ・アラップ・モイ	*1,3	主要都市名	モンバサ、キスム、ナクル	*3
			雇用総数	14,940 千人（1998 年）	*6
独立年月日	1963 年 12 月 12 日	*3,4	義務教育年数	8 年間（　　年）	*13
主要民族／部族名	ｷｸﾕ人 21%,ﾙﾋｬ人 14%,ﾙｵ 13%等	*1,3	初等教育就学率	84.9 %（ 1997 年）	*6
主要言語	スワヒリ語、英語	*1,3	中等教育就学率	24.4 %（ 1997 年）	*6
宗教	キリスト教 70%、イスラム教 6%	*1,3	成人非識字率	17.5 %（ 2000 年）	*13
国連加盟	1963 年 12 月 16 日	*12	人口密度	51.47 人/km^2（1998 年）	*6
世銀加盟	1964 年 2 月 3 日	*7	人口増加率	3.1 %（1980 年）	*6
IMF 加盟	1964 年 2 月 3 日	*7	平均寿命	平均 51.30 男 50.50 女 52.20	*10
領土面積	583.00 千 km^2	*1,6	5 歳児未満死亡率	124/1000（1998 年）	*6
人口	29,295 万人 (1998 年)	*6	ｶﾛﾘｰ供給量	1,976.0 cal/日/人（1997 年）	*10

経済指標					
通貨単位	ケニア・シリング(Shilling)	*3	貿易量	（ 1998 年）	
為替（1US$）	1US$=78.58 （2001 年 6 月）	*8	商品輸入	2,013.1 百万ドル	*15
会計年度	Jun. 30	*6	商品輸出	-3,028.7 百万ドル	*15
国家予算	（ 1996 年）		輸入カバー率	2.4(月)（1998 年）	*14
歳入総額	143,088 百万ｹﾆｱ･ｼﾘﾝｸﾞ	*9	主要輸出品目	紅茶、コーヒー、園芸作物、石油製品	*1
歳出総額	152,832 百万ｹﾆｱ･ｼﾘﾝｸﾞ	*9	主要輸入品目	産業機械、原油、鉄鋼、自動車、食料	*1
総合収支	73.7 百万ドル（1998 年）	*15	日本への輸出	26 百万ドル（1999 年）	*16
ODA 受取額	473.9 百万ドル（1998 年）	*18	日本からの輸入	156 百万ドル（1999 年）	*16
国内総生産(GDP)	11,578.58 百万ドル（1998 年）	*6			
１人当たり GNP	1,560.0 ドル（1998 年）	*6	粗外貨準備額	783.1 百万ドル(1998 年)	*6
GDP 産業別構成	農業　26.1%（1998 年）	*6	対外債務残高	7,009.8 百万ドル(1998 年)	*6
	鉱工業　16.2%（1998 年）	*6	対外債務返済率(DSR)	18.8 %（1998 年）	*6
	ｻｰﾋﾞｽ業　57.7%（1998 年）	*6	インフレ率	18.8 %（1998 年）	*6
産業別雇用	農業 男 18.6%,女 19.8%(1992 年)	*6	(消費者価格物価上昇率)		
	鉱工 業 23.1%,　9.2%（1992 年）	*6			
	ｻｰﾋﾞｽ業 58.3%,　70.9%（1992 年）	*6	国家開発計画		
経済成長率	2.2 %（ 1990 年）	*6			*11

気象（1961～1990 年平均）　観測地：ナイロビ（南緯 1 度 19 分、東経 36 度 55 分、標高 1,624m）													*4,5
月	1	2	3	4	5	6	7	8	9	10	11	12	平均/計
降水量	39.9	48.3	68.6	152.9	107.5	26.5	12.4	13.3	23.6	43.8	121.2	79.6	737.6 mm
平均気温	19.3	20.1	20.5	20.2	19.1	17.7	16.9	17.2	18.5	19.7	19.3	19.1	19.0 ℃

*1 各国概況（外務省）
*2 世界の国々一覧表（外務省）
*3 世界年鑑 2000 (共同通信社)
*4 最新世界各国要覧（東京書籍）
*5 理科年表 2000（国立天文台）
*6 World Development Indicators 2000
*7 The World Bank Public Information Center, International Financial Statistics Yearbook 1998
*8 Universal Currency Converter,
*9 Government Finances Statistics Yearbook 1998(IMF)
*10 Human Development Report 1999 (UNDP)
*11 Country Profile (EIU) 外務省資料等
*12 United Nations Member States
*13 Statistical Yearbook 1999 (UNESCO)
*14 Global Development Finance 1999 (WB)
*15 International Finances Statistics 1999 (IMF)
*16 世界各国経済情報ファイル 1999（日本貿易振興会）
柱：商品輸入については複式簿記の計上方式を採用しているため支払額はマイナス標記になる。

国　名	ケニア共和国
	Republic of Kenya

*17

我が国における ODA の実績					（資金協力は約束ベース、単位：億円）
項目　　暦年	1995	1996	1997	1998	1999
技術協力	36.89	38.53	42.83	35.52	
無償資金協力	29.27	39.21	31.18	21.63	
有償資金協力	0.00	156.57	0.00	0.00	
総額	66.16	234.31	74.01	57.15	

*17

該当国に対する我が国 ODA の実績					(支出純額、単位：百万ドル)
項目　　年度	1995	1996	1997	1998	1999
技術協力	46.05	35.18	35.88	31.94	
無償資金協力	47.72	40.94	29.36	8.91	
有償資金協力	104.66	16.70	3.54	11.73	
総額	198.43	92.82	68.78	52.29	

*18

ＯＥＣＤ諸国の経済協力実績					（支出純額、単位：百万ドル）
	贈与（1） （無償資金協力 技術協力）	有償資金協力 (2)	政府開発援助 （ＯＤＡ） (1)+(2)=(3)	その他政府資金 および民間資金 (4)	経済協力総額 (3) + (4)
二ヶ国間援助	268.9	6.4	275.3	118.3	393.6
（主要供与国）					
1.United Kingdom	46.0	8.1	54.1	-18.1	36.0
2.Japan	40.9	11.7	52.6	41.2	93.8
3.Germany	32.0	7.0	39.0	-7.0	32.0
4.United States	30.7	-0.9	29.8	85.3	115.1
多国間援助	76.8	124.0	200.8	-73.1	127.7
（主要援助機関）					
1.IDA			108.4	0.0	108.4
2.EC			42.5	0.0	42.5
その他	1.5	-3.7	-2.2	0.0	-2.2
合計	347.2	126.7	473.9	45.2	519.1

*19

援助受入窓口機関
技術協力：　大蔵・計画省（Ministry of Finance and Planning）
無償　　：　大蔵・計画省（Ministry of Finance and Planning）
協力隊　：　大蔵・計画省（Ministry of Finance and Planning）

*17 我が国の政府開発援助 1999（国際協力推進協会）
*18 International Development Statistics (CD-ROM) 2000 OECD
*19 JICA 資料

資料５．　討議議事録（M/D）

１）現地調査時

Minutes of Discussions
On the Basic Design Study
On the Project for Improvement of Rural Road Bridges in Eastern Province of the Republic of Kenya.

In response to a request from the Government of the Republic of Kenya (hereinafter referred to as "Kenya"), the Government of Japan decided to conduct a Basic Design Study on the project for Improvement of Rural Road Bridges in Eastern Province of Kenya (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA") .

JICA sent to Kenya the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Masakazu Fukuwaka, Senior Advisor, JICA, and is scheduled to stay in the country from February 11 to March 19, 2001.

The Team held discussions with the officials concerned of the Government of Kenya and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Nairobi, February 21, 2001

Masakazu Fukuwaka
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan

Eng. Erastus K. Mwongera EBS, OGW
Permanent Secretary
Ministry of Roads & Public Works
Republic of Kenya

Countersigned By

~~M. I. Oduor Otieno~~ MWAGHAZI MWACHOFI
Permanent Secretary
Ministry of Finance & Planning
Republic of Kenya

ATTACHMENT

1. Objective of the Project

The objective of the Project is to reconstruct 2 bridges, Athi Bridge and Ikutha Bridge, along the Route B7 to secure safe and smooth traffic on the national-trunk route between Embu and Kibwezi.

2. Project sites

The sites of the Project are shown in Annex-1.

3. Responsible and Implementing Agency

The responsible and implementing organization is Roads Department, Ministry of Roads & Public Works (MOR&PW).

The organization chart of Roads Department is shown in Annex-2.

4. Items requested by the Government of Kenya

After discussions with the Team, the components of the Project were finally requested by Kenyan side are as follows;

- Reconstruction of Athi bridge and Ikutha bridge
- River works for protection of bridges
- Construction of approach roads

JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

5-1. Kenyan side understands the Japan's Grant Aid Scheme explained by the Team, as described in ANNEX-3.

5-2. Kenyan side will take the necessary measures, as described in Annex-4, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Kenya until March 19.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around June, 2001.

6-3. In case that the contents of the report is accepted in principle by the Government of Kenya, JICA will complete the final report and send it to the Government of Kenya by November, 2001.

7. Other relevant issues

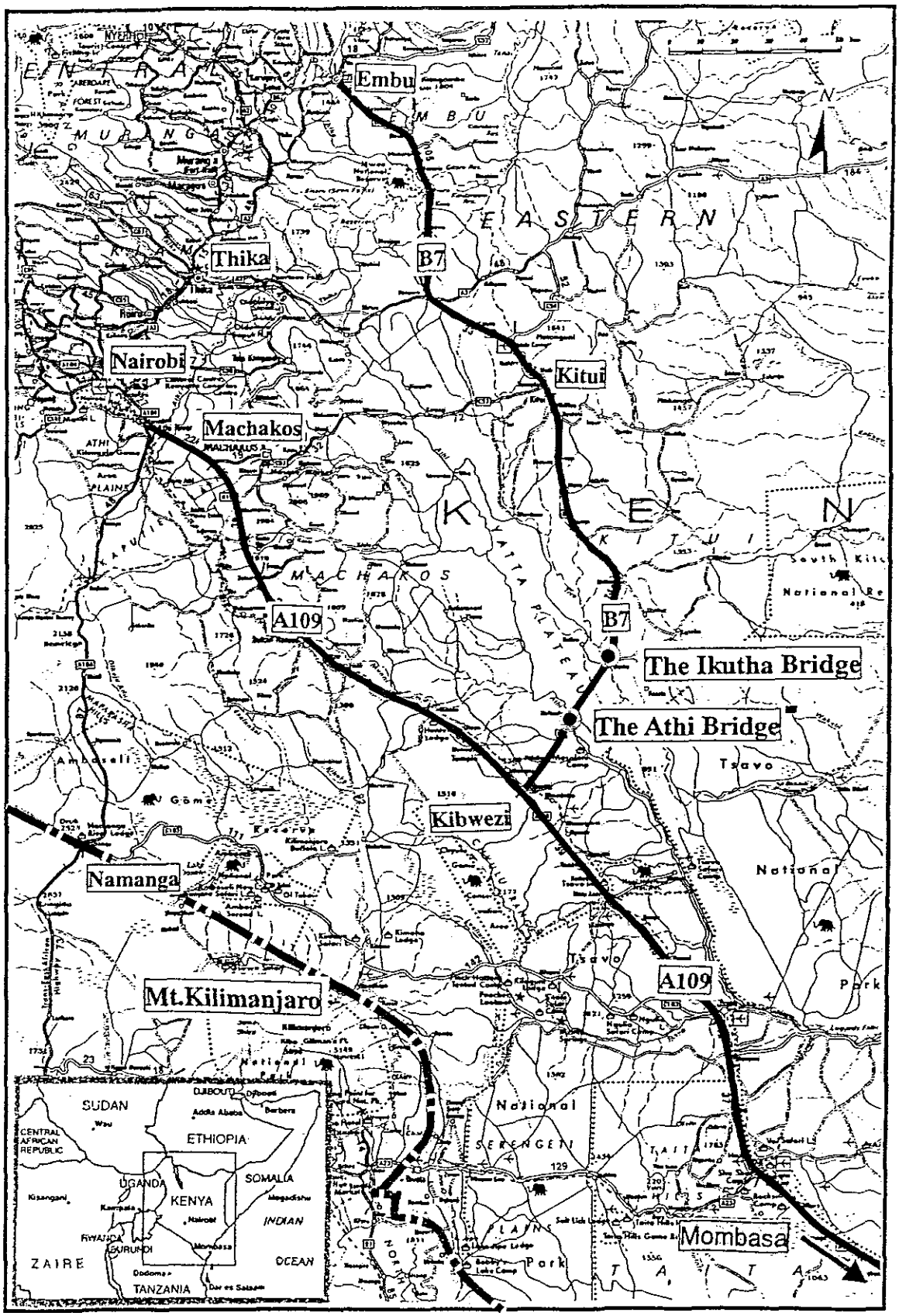
7-1. The land acquisition necessary for construction of bridges shall be secured. Therefore the Kenyan side shall complete the procedure for the acquisition of necessary land by the end of October, 2001.

7-2. Both sides confirmed the relocation of the utilities (water lines, power lines etc.) is not necessary, since none is existing.

7-3. In case the position of new bridge is different from the old one, Kenyan side will demolish the old bridge by their own budget.

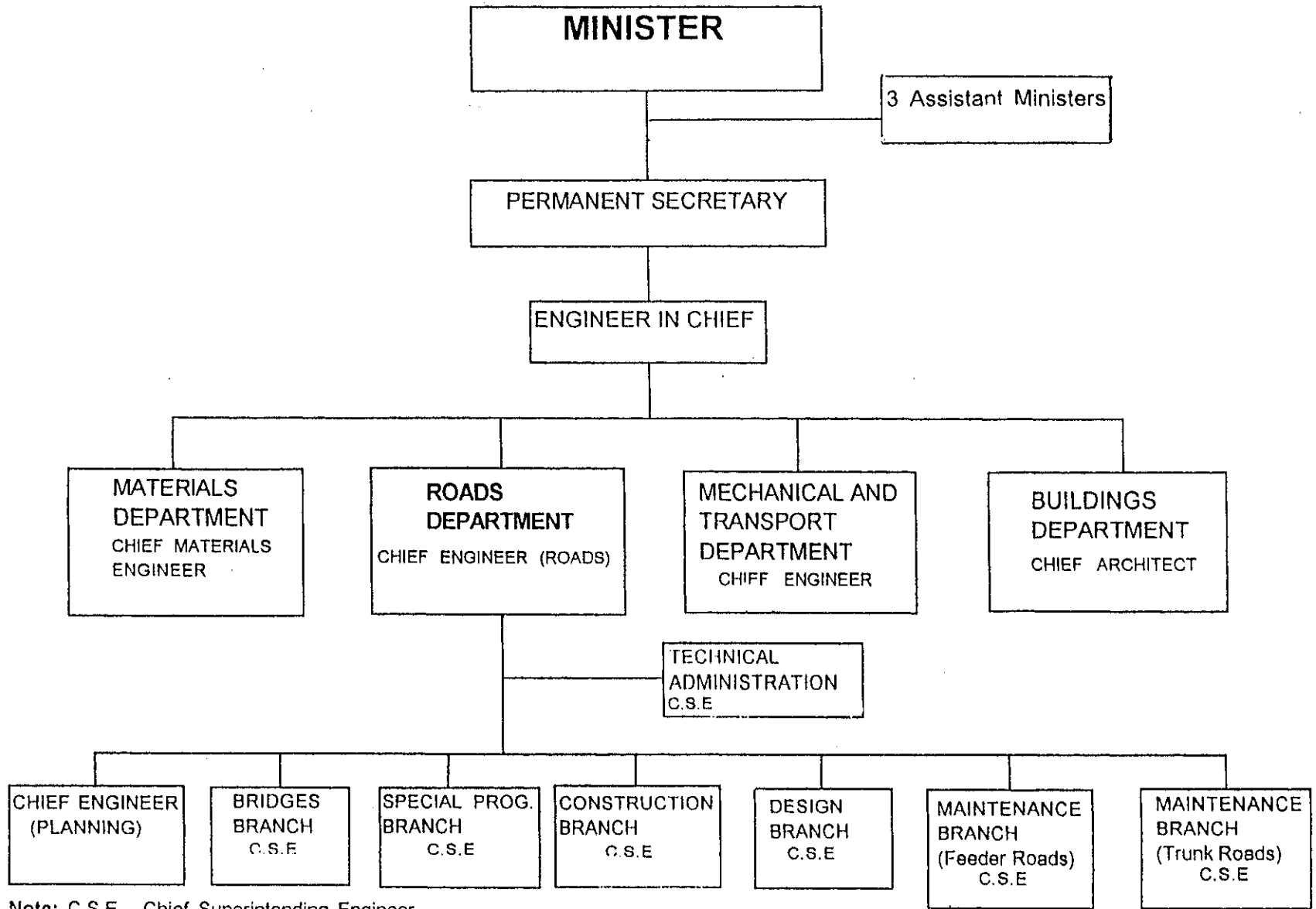
7-4. Both sides confirmed the necessary procedures for approval of EIA (Environmental Impact Assessment) will be implemented by Kenyan side and completed by early in June, 2001.

THE SITES OF THE PROJECT



MINISTRY OF ROADS AND PUBLIC WORKS

ORGANISATION STRUCTURE



Note: C.S.E - Chief Superintending Engineer

THE ORGANIZATION CHART OF ROAD DEPARTMENT

(ANNEX-2)

JAPAN'S GRANT AID SCHEME

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the

Project.
- Preparation of a Basic Design of the Project.
- Estimation of cost of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses registered consulting firms. JICA selects firms based on proposals submitted by interested firms. The firms selected carry out a Basic Design Study and write a report, based upon terms of reference set by JICA.

The consulting firms used for the Study are recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

5) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,
b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
c) To secure buildings prior to the procurement in case the installation of the equipment,
d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified Contracts,
f) To accord Japanese nationals, whose services may be required in connection with supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(ANNEX-4)

Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	a) Advising Commission of A/P		●
	b) Payment commission		●
3	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	a) Marine (Air) transportation of the products from Japan to the recipient country	●	
	b) Tax exemption and customs clearance of the products at the port of disembarkation		●
	c) Internal transportation from the port of disembarkation to the project site	●	
4	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
5	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
6	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
7	To bear all the expense, other than those to be borne by the Grant Aid, necessary for construction of the facilities		●

2） 基本設計概要説明時

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON THE PROJECT FOR RECONSTRUCTION OF ATHI AND IKUTHA BRIDGES

(Improvement of Rural Road Bridges in Eastern Province)

IN THE REPUBLIC OF KENYA

(EXPLANATION OF DRAFT REPORT)

In February 2001, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Reconstruction of Athi and Ikutha Bridges (hereinafter referred to as "the Project") to the Republic of Kenya (hereinafter referred to as "Kenya"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a Draft Report of the study.

In order to explain and to consult the Government of Kenya on the components of the Draft Report, JICA sent to Kenya the Draft Report Explanation Team (hereinafter referred to as "the Team"), which was headed by Mr. Takeshi Naruse, Deputy Resident Representative, JICA Kenya Office, from June 21 to June 27, 2001.

As a result of discussions, both parties confirmed the main items described on the attached sheet.

Nairobi, June 27, 2001

Takeshi Naruse
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan

Eng. Erastus K. Mwongera EBS, OGW
Permanent Secretary
Ministry of Roads & Public Works
Republic of Kenya

Counter-signed by:

Mwaghazi Mwachofi
Permanent Secretary
Ministry of Finance & Planning
Republic of Kenya

ATTACHMENT

1.Components of the Draft Report
The Government of Kenya agreed and accepted in principle the components of the Draft Report explained by the Team.

2.Japan's Grant Aid Scheme
The Kenyan side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Kenya as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on February 21, 2001.

3.Schedule of the Study
JICA will complete the Final Report in accordance with the confirmed items and send it to the Government of Kenya by October 2001.

4. Other Relevant Issues
(1) Both sides confirmed that the Project name has changed from "Improvement of Rural Road Bridges in Eastern Province" to "Reconstruction of Athi and Ikutha Bridges".

(2) The Government of Kenya shall complete the necessary land acquisition based on the map indicated in the Draft Report, and as indicated in 7-1 of the Minutes of Discussions signed by both parties on February 21, 2001.

(3) The Team confirmed that the Draft Report of the Environment Impact Assessment (EIA) for the Project is in preparation by the Ministry of Roads and Public Works (MOR&PW), and would be ready by July 20, 2001.
It should be noted that the Government of Kenya promised to have the Final Report and Clearance Letter of the EIA ready by the end of November 2001.

(4) The Government of Kenya shall demolish the old bridges with its own budget in the sub-sequent financial year after the completion of the construction work of the new bridges.

(5) The approach road, which will extend 200m from Athi Bridge on the Kitui side (indicated in the Draft Report), will be constructed by the Government of Japan. The Government of Kenya will improve the remaining part (3km) of approach road during the construction of the bridge (using Fuel Levy Fund).

(6) To make the Project more effective, the Government of Kenya will improve the drifts between Athi Bridge and Ikutha Bridge on Route B7. Further, the Government of Kenya has intention of upgrading the whole Route B7.

資料　6　　事前評価表（基本設計調査結果概要）

１．協力対象事業名

ケニア共和国　アティ橋・イクサ橋架け替え計画

２．我が国が援助することの必要性・妥当性

(1) 我が国とケニア国とは緊密な友好関係を有しており、同国の東アフリカでの地理的、政治経済的な重要性に鑑み、ケニアはアフリカにおける我が国援助の重点国の一つに位置づけられている。また、貿易・投資面でも、アフリカ諸国の中では南アフリカ共和国に次いで我が国と密接な相互依存関係を有している。

(2) ケニアでは、陸上輸送の大部分（旅客では 96%、物資では 87%）を道路に依存しており、第８次国家開発計画(1997～2001)の中でも、効率的かつ組織付けられた道路網は、国家開発計画に定められた社会経済目標の達成に極めて重要であるとして、道路・橋梁は重点分野となっている。しかし、1997 年、98 年のエルニーニョ現象が原因とされる豪雨により洪水が発生し、ケニア中部・西部において多くの中小橋が流出する被害を受け、道路網整備を進める中で新たな障害となった。下表にケニアの道路状況を示す。

道路区分別延長（1999 年現在）　　単位:km

道路区分	A 国際幹線道路	B 国内幹線道路	C 主 要道 路	D 2 次道 路	E 地 方道 路	F 特 別道 路	合計
舗装	2,890	1,430	2,490	1,170	750	210	8,940
未舗装、砂利	870	1,370	5,180	10,050	25,800	11,090	54,360

(3) 洪水による流出の被害を受けた橋梁のうち、国内幹線道路 B7 号線上に位置するアティ橋とイクサ橋は、復旧の緊急度が高い。この B7 号線は沿線地域の農産物の輸送ばかりでなく、ナイロビ北東部の主要都市と国際貿易港のあるモンバサとをナイロビを経由せず直接結ぶ重要な路線である。このため、アティ橋については、被災後、ベイリー橋を用い緊急復旧されたものの、25 トンを超える車両は通行できず、桁のたわみも大きく危険な状況である。

３．協力対象事業の目的等

本事業では、アティ橋とイクサ橋の２橋を恒久橋に架け替えることにより、橋梁地点の安全且つ円滑な交通を確保することを目的とする。

４．協力対象事業の内容

（１）対象地域
東部州キツイ郡及びマクエニ郡

（２）アウトプット
アティ橋、イクサ橋上の安全且つ円滑な交通が確保できる。

（３）インプット
① アティ橋（橋長 120m）の架け替え、取付道路（延長 540m）の建設。
② イクサ橋（橋長　75m）の架け替え、取付道路（延長 445m）の建設。

（４）総事業費
概算事業費 11.11 億円（日本側 10.89 億円、ケニア国側 0.22 億円）

（５）スケジュール
32 ヶ月（実施設計約 8 ヶ月、施設建設約 24 ヶ月）

（６）実施体制
道路公共事業省　道路局　(Ministry of Roads and Public Works, Road Department)

５．プロジェクトの成果

(1) プロジェクトにて裨益を受ける対象の範囲及び規模：

アティ橋及びイクサ橋が位置する国内幹線道路 B7 号線上のマクエニ郡、キツイ郡が裨益を受ける地区となり裨益人口は約 153 万人である。

(2) 事業の目的（プロジェクト目標）を示す成果指標：

・協力対象橋梁上を 25 トンを超える産業用大型車両の通行が可能

	2001 年(実施前)	2004 年（実施後）
通行可能な最大車両重量	２５トン	５５トン

・内陸部への輸送時間の短縮とコストの節減

国際貿易港のモンバサからナイロビを経由せず内陸部への大型車両を用いた物資の輸送が可能となる。

輸送区間	輸送時間の短縮	輸送コストの節減
モンバサ～エンブ間	約 10 時間 15 分→約 9 時間 45 分 （約 30 分の短縮）	約　300 ksh / ﾄﾝ
モンバサ～キツイ間	約 9 時間→約 7 時間 （約 2 時間の短縮）	約 1,300 ksh / ﾄﾝ

(1ksh＝1.46 円　2001.3)

(3) その他の成果指標

・架橋地点における、産業用大型車両を含めた通過交通量の増加

６．外部要因リスク

上記プロジェクト目標が達成されるために、以下の条件が必要となる。

・道路、橋梁の計画的な維持管理の実施

建設された道路、橋梁施設を長期的に健全な状態に保つためには適切な維持管理が必要であり、道路公共事業省道路局が担当する。「ケ」国では、現在、道路維持管理体制等に関して見直しをしており、これを早期に完成し、計画的に維持管理を実施する必要がある。

７．今後の評価計画

（１）事業評価に用いる成果指標

① 25 トン以上の産業用大型車両の通行。

② 輸送時間、輸送コスト

③ 交通量

（２） 評価のタイミング

施設建設後１０年以降に事後評価予定。

資料７　参考資料／入手資料リスト

No		資　料　名	発行年	発行元	単位	数量	種別	装丁	規格	頁数	入手先		入手日付	返却日付	備考
Ⅰ．開発計画・統計資料															
1		Economic Survey	2000	Ministry of finance and Planning	冊	1		コピー	A4	188	MORPW		2/12/01	2/28/01	
2		Medium Term Expenditure Framework Report	2000	MORPW	冊	1		コピー	A4	97	MORPW		2/12/01	2/28/01	
3		Fuel Levy Budget	2000	MORPW	冊	1		コピー	A4	45	MORPW		2/12/01	2/28/01	
4		Recurrent Expenditure Summary 2000/2001 and Projected Expenditure Estimates for 2001/2002- 2002/2003	2000	MORPW	冊	1		コピー	A4	43	MORPW		2/12/01	2/28/01	
5		Development Expenditure Summary 2000/2001 and Projected Expenditure Estimates for 2001/2002- 2002/2003	2000	MORPW	冊	1		コピー	A4	23	MORPW		2/12/01	2/28/01	
6		Makueni District Development Plan 1997-2001		Office of the Vice-President and Ministry of Planning and National Development	冊	1		コピー	A4	113	MORPW		2/12/01	2/28/01	
7		Kitui District Development Plan 1997-2001		同上	冊	1		コピー	A4	138	MORPW		2/12/01	2/28/01	
8		Mbeere District Development Plan 1997-2001		同上	冊	1		コピー	A4	136	MORPW		2/12/01	2/28/01	
9		Embu District Development Plan 1997-2001		同上	冊	1		コピー	A4	128	MORPW		2/12/01	2/28/01	
10		Machakos District Development Plan 1997-2001		同上	冊	1		コピー	A4	196	MORPW		2/12/01	2/28/01	
11		Historical Traffic Data			部	1		コピー	A4	8	MORPW		2/12/01	2/28/01	
12		Brief on Kenya – Japan Cooperation in the Road Sector		MORPW	部	1		コピー	A4	13	MORPW		2/12/01	2/28/01	
13		Brief on the African Development Bank Support to Roads		MORPW	部	1		コピー	A4	8	MORPW		2/12/01	2/28/01	
14		Brief on Kenya – BADEA Co-operation in the Road Sector		MORPW	部	1		コピー	A4	4	MORPW		2/12/01	2/28/01	
15		Brief on Kenya – China Co-operation		MORPW	部	1		コピー	A4	3	MORPW		2/12/01	2/28/01	
16		Participation of the European Union in the Development of the Roads Sector in Kenya		MORPW	部	1		コピー	A4	6	MORPW		2/12/01	2/28/01	
17		Brief on the Kenya – German Cooperation in the Roads Sector		MORPW	部	1		コピー	A4	4	MORPW		2/12/01	2/28/01	
18		Brief on Kenya – World Bank Cooperation in the Roads Sector		MORPW	部	1		コピー	A4	5	MORPW		2/12/01	2/28/01	
19		Statistical Abstract		Ministry of Finance and Planning	部	1		オリジナル	A4	336					
Ⅱ．技術仕様書															
1		Road Design Manual Part Ⅰ Geometric Design of Rural Roads	1979	MOW	冊	1		コピー	A4	142	MORPW		2/12/01	2/28/01	
2		Road Design Manual PartⅢ Materials and Pavement Design for New Roads	1987	MOW	冊	1		コピー	A4	194	MORPW		2/12/01	2/28/01	
3		Technical Data Manual for Design of BridgesVolume1 Hydrological Data	1990	MOW	冊	1		コピー	A4	97	MORPW		2/12/01	2/28/01	
4		Technical Data Manual for Design of Bridges Volume2 Climatological Data	1990	MOW	冊	1		コピー	A4	136	MORPW		2/12/01	2/28/01	
5		Technical Data Manual for Design of BridgesVolume3 Soils, Geology, Seismic, Topography and Morphology Data	1990	MOW	冊	1		コピー	A4	94	MORPW		2/12/01	2/28/01	
6		Departmental Standard BD 37/88 Loads for Highway Bridge			部	1		コピー	A4	3	MORPW		2/12/01	2/28/01	
Ⅲ．地図類															
1		Kitui Kibwezi Nairobi Amboseli Nyeri 1:250,000	1975	Survey of Kenya	部	1		オリジナル	A1		Survey of Kenya		2/12/01		
2		Ikutha Thavu Thavu Kitui Kavisuni Mutomo Ikanga Ikoyo　1:50,000	1974	Survey of Kenya	部	1		オリジナル	A1		Survey of Kenya		2/12/01		
Ⅳ．図面類															
1		Seismic Zoning Map of Kenya Showing Maximum Observed Intensities		MORPW	部	1		コピー		1	MORPW		2/12/01	2/28/01	
Ⅴ．技術（建設、調査）資料類															
1		Brief on Athi River Bailey on Kibwezi – Mutomo – Kitui(B7) Road		MORPW	部	1		コピー	A4	3	MORPW		2/12/01	2/28/01	
2		Gravelling of Kitui – Mutomo, Kangonde – Syongila and Mutomo – Kibwezi Roads(B7) Projects		MORPW	部	1		コピー	A4	2	MORPW		2/12/01	2/28/01	
3		Inventory of Bailey Bridge	2001	MORPW	部	1		コピー	A4	1	MORPW		2/12/01	2/28/01	
Ⅵ．名簿類															
Ⅶ．その他															
Ⅷ.別添資料															

８－１　エルニーニョによる被害データ

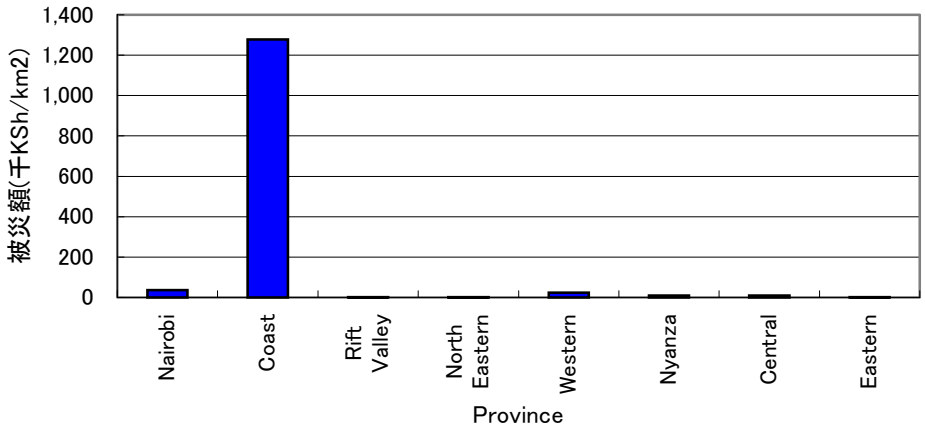


図 A-8-1-1 エルニーニョによる面積当り道路関連（橋梁含む）被災額　出典：MORPW 資料

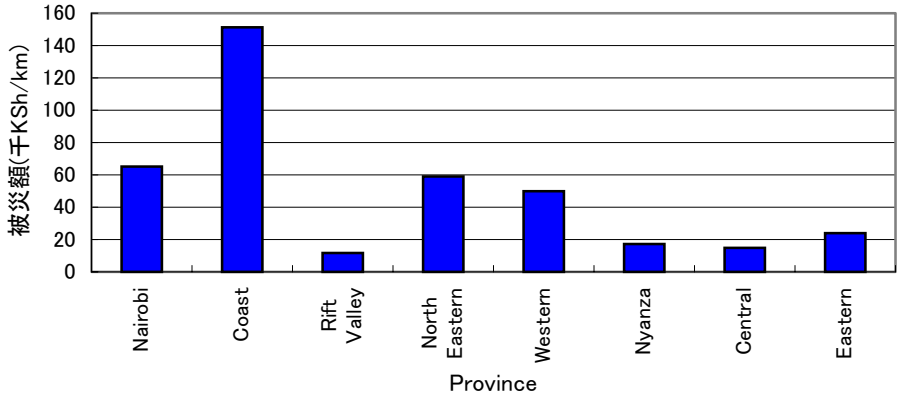


図 A-8-1-2　エルニーニョによる道路延長当り道路関連（橋梁含む）被災額　出典：MORPW 資料

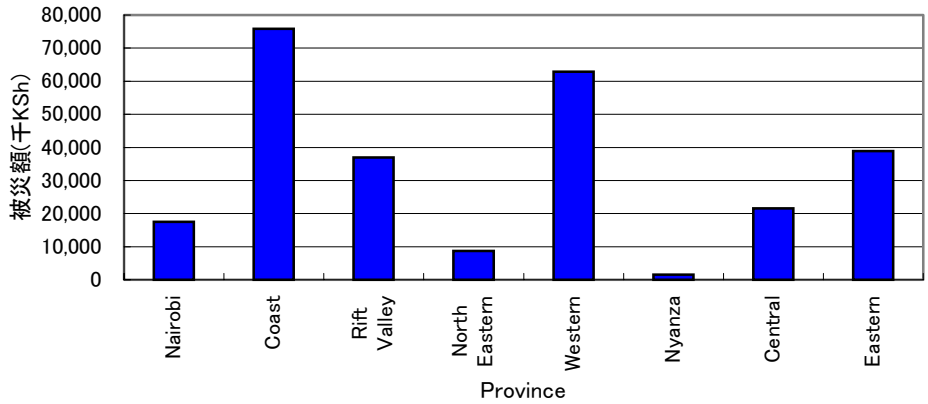


図 A-8-1-3　エルニーニョによる橋梁（取付け道路含む）被災額　出典：MORPW 資料

８－２　人口計画データ

表 A-8-2-1　キツイ県の人口計画　　（単位：人）

郡	1989	1997	1999	2001
Central	76,700	99,929	106,762	114,061
Chuluni	77,644	101,160	108,075	115,466
Mutitu	37,155	48,408	51,718	55,254
Mutomo	104,857	136,614	145,955	155,935
Yatta	32,528	42,379	45,277	48,373
Kabati	83,644	108,976	116,428	124,389
合　　計	412,528	537,466	574,215	613,478

（出所：Kitui District Development Plan 1997-2001）

表 A-8-2-2　キツイ県の人口密度計画　　（単位：人/ km^2）

郡	1989	1997	1999	2001
Central	100	200	213	228
Chuluni	126	123	131	140
Mutitu	10	13	14	15
Mutomo	8	10	11	12
Yatta	28	37	39	42
Kabati	126	164	175	187
合計	398	547	583	624

（出所：Kitui District Development Plan 1997-2001）

表 A-8-2-3　マクエニ県の人口計画　　（単位：人）

郡	1989	1997	1999	2001
Matiliku	50,083	64,126	68,214	72,562
Wote	21,473	27,494	29,247	31,111
Kalawa	25,493	32,641	34,722	36,935
Kathonzweni	59,670	76,401	81,272	86,452
Kilome	66,343	84,946	90,360	96,120
Kasikeu	35,228	45,106	47,981	51,040
Mulala	38,106	48,791	51,901	55,209
Mbooni	48,239	61,765	65,702	69,891
Kisau	46,209	59,166	62,938	66,949
Tulimani	28,777	36,846	39,195	41,693
Makindu	34,522	44,202	47,020	50,017
Kaiti	66,026	85,540	89,929	95,661
Kibwezi	28,590	36,607	38,840	41,424
Mtito - Andei	88,235	112,976	120,278	127,838
合計	636,994	816,607	867,599	922,902

（出所：Makueni District Development Plan 1997-2001）

表 A-8-2-4 マクエニ県の人口密度計画　　（単位：人／ km^2）

郡	1989	1997	1999	2001
Matiliku	81	104	110	117
Wote	85	108	115	122
Kalawa	67	86	92	98
Kathonzweni	699	89	95	101
Kilome	108	139	147	157
Kasikeu	138	176	187	199
Mulala	176	225	239	254
Mbooni	333	426	453	482
Kisau	162	208	221	235
Tulimani	228	292	311	331
Makindu	29	37	39	452
Kaiti	238	304	323	344
Kibwezi	72	92	98	104
Mtito – Andei	49	62	66	71
合計	86	110	117	124

（出所：Makueni District Development Plan 1997–2001）

８－３　水文・水理資料

表　A-8-3-1　アティ川３ＦＯ２観測所の年最大洪水流量

年	月	日	洪水流量 (m3/s)	年	月	日	洪水流量 (m3/s)
1956	Nov	17	323	1973	-	-	-
1957	Apr	26	257	1974	Mar	31	465
1958	May	15	486	1975	Apr	17	877
1959	Nov	29	249	1976	Nov	28	282
1960	Mar	27	122	1977	Apr	10	877
1961	Nov	15	1800	1978	May	25	2110
1962	Jan	4	590	1979	Mar	5	496
1963	Dec	9	493	1980	May	8	202
1964	Jan	3	217	1981	Apr	13	721
1965	Nov	22	269	1982	Dec	4	877
1966	Apr	29	148	1983	Apr	29	211
1967	Apr	14	574	1984	Apr	11	132
1968	Apr	30	470	1985	Apr	17	496
1969	Nov	13	143	1986	Dec	7	1080
1970	Apr	24	364	1987	-	-	-
1971	Apr	27	751	1988	Apr	27	619
1972	May	12	187	1989	Apr	8	491

（注１）　出典：The Study on The National Water Master Plan, July 1992, JICA
（注２）　流域面積：10,132km2
（注３）　“－”：欠測

表 A-8-3-2 アティ川３ＦＯ９観測所の年最大洪水流量

年	月	日	水位 (m)	洪水流量 (m3/s)	欠測月	年	月	日	水位 (m)	洪水流量 (m3/s)	欠測月
1980	May	08	1.94	364	1～3 月	1991	-	-	-	-	1～12 月
1981	Apr.	13	4.50	3,107	11 月、12 月	1992	-	-	-	-	1～12 月
1982	Dec.	06	7.00	10,079	1 月、7～9 月	1993	-	-	-	-	1～12 月
1983	Jan.	01	0.20	5.1	2～12 月	1994	-	-	-	-	1～12 月
1984	Nov.	09	6.00	6,666	1～7 月	1995	Apr.	25	4.40	2,928	1～3 月、9 月
1985	Apr.	21	3.20	1,279	2 月,7～10 月	1996	Apr.	08	3.10	1,179	8 月、10～12 月
1986	Jan.	11	0.80	48.7	5～12 月	1997	-	-	-	-	1～12 月
1987	Nov.	24	1.64	243	1 月	1998	-	-	-	-	1～12 月
1988	Apr.	28	3.70	1,861		1999	Nov.	30	5.90	6,373	1～10 月
1989	Apr.	09	3.91	2,149		2000	Nov.	29	4.00	2,281	4～9 月、12 月

（注１）出典：Water Resources Database, Ministry of Environment and Natural Resources
（注２）　“－”：欠測

8－4 ボーリング柱状図

GEOLOGICAL RECORD OF BORING

			Date of Drilling:	27-28/03/2001
Project	:	Improvement Rural Road Bridges	**Angle from the vertical:**	0
Bore Hole Number	:	ATHI BH1	**Depth of Hole (m):**	7.00
Ground Elevation	:	706.18	**Depth to the gr. water level (m):**	
Dia. of the hole (mm)	:	153mm-131mm	**Logged By:**	LEWIS

Elevation (m)	Depth (m)	Thickness (m)	Field Observations: Column Section	Soil / Rock Classifn.	Colour	Description
706.18	0.00	0.00				
					Red brown	Soft very fine soil mixed with some sand
704.68	1.50	1.50				
703.98	2.20	0.70			Brown	As above;slightly more compact and grannular
703.63	2.55	0.35			Gray/ brown	Coarse grained Biotite gneiss; weathered
703.18	3.00	0.45			Brown	Fine grained sands
702.98	3.20	0.20			Brown/ Grey	Fine grained Biotite Gneiss with Hornblend fine grained and fragmented
702.28	3.90	0.70			Ditto	As above; foliated and fractured with minor intercalations of quartzo-feldspathic pegmatites
					Gray	Leucocratic medium grained Biotite Gneiss, weathered and foliated with machine generated fractures.
700.78	5.40	1.50				
					Gray	Medium to fine grained Biotite gneiss leucocratic as above with distinct foliationsand machine generated Fractures.
699.18	7.00	1.60				

Standard Penetration Test

Depth (m)	(N)	0	10	20	30	40	50
1.00					27		
2.00							
3.00							50
4.00							
5.00							
6.00							
7.00							
8.00							
9.00							
10.00							
11.00							
12.00							
13.00							
14.00							
15.00							

GEOLOGICAL RECORD OF BORING

Project	:	Improvement Rural Road Bridges	**Date of Drilling:**	5-10/03/2001
			Angle from the vertical:	0
Bore Hole Number	:	Athi BH2	**Depth of Hole (m):**	8.90
Ground Elevation	:	701.48	**Depth to the gr. water level (m):**	
Dia. of the hole (mm)		:200mm-31mm-68mm	**Logged By:**	LEWIS

	Elevation (m)	Depth (m)	Thickness (m)	Field Observations				Standard Penetration Test							
				Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50
0.00	701.48	0.00	0.00												
0.50															
1.00								1.00							
1.50															
2.00								2.00							
2.50															
3.00						Light brown	Medium to fine grained sands almost entirely composed of quartzofeldspathic detritals	3.00							
3.50															
4.00								4.00							
4.50															
5.00								5.00							
5.50															
6.00	695.78	5.70	5.70				massive hard rock with little amount of Biotite.	6.00							
6.50	694.98	6.50	0.80			White / Gray	Coarse grained with no visible signs of weathering.								
7.00								7.00							
7.50															
8.00						Gray	signs of weathering .	8.00							
8.50							Has machine broken fractures along foliation planes.								
9.00	692.58	8.90	2.40					9.00							
9.50															
10.00								10.00							
10.50															
11.00								11.00							
11.50															
12.00								12.00							
12.50															
13.00								13.00							
13.50															
14.00								14.00							
14.50															
15.00								15.00							
15.50															

GEOLOGICAL RECORD OF BORING

Project : Improvement Rural Road Bridges
Bore Hole Number :Athi-BH3
Ground Elevation :
Dia. of the hole (mm) :151mm-101mm-76mm

Date of Drilling: 10-13/03/2001
Angle from the vertical: 0
Depth of Hole (m): 12.70
Depth to the gr. water level (m):
Logged By: LEWIS

	Elevation (m)	Depth (m)	Thickness (m)	Field Observations				Standard Penetration Test							
				Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50
0.00	701.82	0.00	0.00												
0.50	701.32	0.50	0.50			Brown	Medium grained sands.								
1.00								1.00							
1.50	700.32	1.50	1.00			Brown	Sand with gravel.								
2.00								2.00							
2.50															
3.00						Brown/ Gray	Coarse sand with gravel as above.	3.00							
3.50	698.32	3.50	2.00												
4.00								4.00							
4.50	697.32	4.50	1.00			Brown/ Gray	Clayish sand medium grained.								
5.00								5.00							
5.50	696.32	5.50	1.00				As above ; but pebbly.								
6.00								6.00							
6.50	695.32	6.50	1.00				Sands with little amounts of clay.								
7.00								7.00							
7.50							Sands with some clay								
8.00						Gray/ brown	in the range of medium grained to almost coarse.	8.00							
8.50															
9.00							It also has some organic mattter and Biotite/ muscovite flakes.	9.00							
9.50	692.27	9.55	3.05												
10.00								10.00							
10.50															
11.00								11.00							
11.50						Gray/ Black	Migmatised Gneiss with intimate mixture of light and dark coloured minerals							
12.00								12.00							
12.50															
	689.12	12.70	3.15												
13.00								13.00							
13.50															
14.00								14.00							
14.50															
15.00								15.00							
15.50															

GEOLOGICAL RECORD OF BORING

		Date of Drilling:	2-4/03/2001
Project	: Improvement Rural Road Bridges	**Angle from the vertical:**	0
Bore Hole Number	: Athi-BH4	**Depth of Hole (m):**	8.50
Ground Elevation	: 706.02	**Depth to the gr. water level (m):**	
Dia. of the hole (mm)	: 150mm-101mm-76mm	**Logged By:**	LEWIS

	Eleva-tion (m)	Depth (m)	Thick-ness (m)	Field Observations				Standard Penetration Test							
				Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50
0.00	706.02	0.00	0.00												
0.50															
1.00								1.00							
1.50															
2.00						Light Brown/ Gray	Fine grained almost silty soil with alittle quartz and a little clay.	2.00							
2.50															
3.00								3.00							
3.50															
4.00	702.02	4.00	4.00					4.00							
4.50						Red/ Brown	Completely weathered Gneiss;partly intact, residual rock is mainly composed of quartz and feldspars .								
5.00								5.00							
5.50	700.37	5.65	1.65				Less weathered gneiss & section of the core is completely fragmented consisting of almost entirely quartz and feldspars with little Biotite.								
6.00	700.37	5.65						6.00							
6.50						Brown	Fragmented core consisting of quartzo-felds. Gneiss with machine broken fractures and brown coated fragments.								
7.00								7.00							
7.50															
8.00	698.27	7.75	2.10					8.00							
8.50	697.52	8.50	0.75			Grey	Fresh looking Gneiss showing no signs of weathering with natural and machine broken fractures.								
9.00								9.00							
9.50															
10.00								10.00							
10.50															
11.00								11.00							
11.50															
12.00								12.00							
12.50															
13.00								13.00							
13.50															
14.00								14.00							
14.50															
15.00								15.00							
15.50															

GEOLOGICAL RECORD OF BORING

Project : Improvement Rural Road Bridges
Bore Hole Number : Tiva BH-1
Ground Elevation : 657.66
Dia. of the hole (mm) : 150-131-76mm

Date of Drilling: 17-18/03/2001
Angle from the vertical: 0
Depth of Hole (m): 8.30
Depth to the gr. water level (m):
Logged By: LEWIS

	Elevation (m)	Depth (m)	Thickness (m)	Field Observations				Standard Penetration Test							
				Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50
0.00	657.66	0.00	0.00												
0.50	657.16	0.50													
1.00	656.66	1.00						1.00							
1.50														●	
2.00								2.00							
2.50															
3.00							Biotite Gneiss; well foliated moderately to slightly weathered and non intact.	3.00							
3.50						Grey	With machine generated fractures along foliation planes.								
4.00								4.00							
4.50	653.21	4.45													
5.00								5.00							
5.50															
6.00								6.00							
6.50															
7.00		7.00				Gray	with machine generated fractures.	7.00							
7.50															
8.00								8.00							
8.50	649.36	8.30													
9.00								9.00							
9.50															
10.00								10.00							
10.50															
11.00								11.00							
11.50															
12.00								12.00							
12.50															
13.00								13.00							
13.50															
14.00								14.00							
14.50															
15.00								15.00							
15.50															

GEOLOGICAL RECORD OF BORING

Project	:	Improvement Rural Road Bridges	**Date of Drilling:**	16-17/03/2001
			Angle from the vertical:	0
Bore Hole Number	:	Tiva BH-2	**Depth of Hole (m):**	7.60
Ground Elevation	:	651.11	**Depth to the gr. water level (m):**	
Dia. of the hole (mm)	:	150-101-76mm	**Logged By:**	LEWIS

Elevation (m)	Depth (m)	Thickness (m)	Field Observations: Column Section	Soil / Rock Classifn.	Colour	Description
651.11	0.00					
648.11	3.00				Brown	Sands with high amounts of quartz and feldspars; and some still. I.e. river sand.
647.16	3.95				Gray	Biotite Gneiss with bands of quartz and feldspar rich sections; has machine broken fractures.
643.51	7.60				Gray	feldspathic intercalations fresh and unwethered; Leucocratic gray

Standard Penetration Test

Depth (m)	(N)	0	10	20	30	40	50
1.00		●					
2.00		●					
3.00		●					●
4.00							
5.00							
6.00							
7.00							
8.00							
9.00							
10.00							
11.00							
12.00							
13.00							
14.00							
15.00							

GEOLOGICAL RECORD OF BORING

Project	:	Improvement Rural Road Bridges	**Date of Drilling:**	09-16/03/2001	
Bore Hole Number	:	Tiva BH-3	**Angle from the vertical:**	0	
Ground Elevation	:	651.93	**Depth of Hole (m):**	7.60	
Dia. of the hole (mm)	:	151-131-101-76mm	**Depth to the gr. water level (m):**		
			Logged By:	LEWIS	

Elevation (m)	Depth (m)	Thickness (m)	Field Observations: Column Section	Soil / Rock Classifn.	Colour	Description
651.93	0.00	0.00				
650.93	1.00	1.00			Light Brown/ Gray	
649.93	2.00	1.00			Grey/ Black	Sandy clay
648.93	3.00	1.00			Grey/ Black	Sand with high amounts of clay (clayey sand)
647.73	4.20	1.20			Brown/ Gray	Coarse grained sands
647.23	4.70	0.50			Brown/ Gray	Weathered Biotite Gneiss with machine broken fractures; foliated
646.53	5.40	0.70			Gray	Biotite Gneiss with slight degree of weathering and machine brocken fractures.
644.33	7.60	2.20			Gray	A compact hard rock medium grained and not folieted.

Standard Penetration Test

Depth (m)	(N)	0	10	20	30	40	50
1.00							
2.00							
3.00							
4.00							
5.00							
6.00							
7.00							
8.00							
9.00							
10.00							
11.00							
12.00							
13.00							
14.00							
15.00							

GEOLOGICAL RECORD OF BORING

				Date of Drilling:	06-08/03/2001
Project	:	Improvement Rural Road Bridges		**Angle from the vertical:**	0
Bore Hole Number	:	Tiva BH-4		**Depth of Hole (m):**	9.80
Ground Elevation	:	655.92		**Depth to the gr. water level (m):**	
Dia. of the hole (mm)	:	150-131-101mm		**Logged By:**	LEWIS

	Eleva-tion (m)	Depth (m)	Thick-ness (m)	Field Observations				Standard Penetration Test							
				Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50
0.00	655.92	0.00	0.00												
0.50															
1.00						Light/ Brown	Fine grained sandy soil with minor amounts of clay	1.00							
1.50															
2.00	653.92	2.00	2.00					2.00							
2.50															
3.00								3.00							
3.50															
4.00						Brown	Silty sands granding to pure coarse grained Quartzo-feldspathic sands	4.00							
4.50															
5.00								5.00							
5.50	650.52	5.40	3.40												
6.00								6.00							
6.50							Weatherd Biotite Gneiss that is rich in Biotite. The top portion is highly decomposed.								
7.00						Yellow	The subsequent portions are altered with Biotite altering to vermiculite.	7.00							
7.50															
8.00	648.07	7.85	2.45					8.00							
8.50															
9.00							Biotite Gneiss showing no sings of weathering with randomly oriented Biotite rich pockets	9.00							
9.50						Gray	The core is meedium grained, compacts.								
10.00	646.12	9.80	1.95					10.00							
10.50															
11.00								11.00							
11.50															
12.00								12.00							
12.50															
13.00								13.00							
13.50															
14.00								14.00							
14.50															
15.00								15.00							
15.50															