CHAPTER 4

Chapter 4 Project Evaluation and Recommendations

4-1 Pertinence of the Project in Terms of Present Situation and Beneficial Effects

The Angolan government has been concentrating on improving the traffic infrastructure of the capital Luanda through the Infrastructure Rehabilitation Engineering (IRE) policy, receiving assistance from the World Bank and other international agencies. 41.7 million dollars have been spent since 1992 on infrastructure rehabilitation alone. In particular, the Luanda provincial government has been implementing, in conjunction with the master plan, the reconstruction of high-priority roads and is improving the road network through maintenance and management.

This project is to be conducted in conjunction with the policy and aims to restore the function of urban roads while preventing further deterioration of the city's economy and citizen's quality of living by restoring the arterial and primary urban roads. The following direct effects are anticipated as a result of the project:

Rua Senado da Camara

This route forms the north-south part of a ring route which runs outside of the older section of the city and connects such major routes as Avenida Deolinda Rodrigues (Radial Route 3), Hoji Ya Henda (Radial Route 4), Ngola Kiluanji (Radial Route 5), Avenida Lueji Ankonda (Radial Route 6); therefore serving to connect important routes to one another, mitigating traffic congestion and economizing in travel time.

When Avenida Comandante Kima Kyenda to the north and Avenida 21 de Janeiro to the south (neither of which have been included with this project) are effectively connected with this route, the ring route will be complete, therefore this rehabilitation is an important step in that process. Upon completion, traffic between the airport in the south and port facilities in the north will not be required to travel through the middle of the city, benefiting especially heavy-vehicle traffic.

Aceso a ETA-Marcal

The access road to the reservoir from which the daily water supply for citizens of Luanda is transported by trucks, will be improved.

Quinta Avenida

This route is an important north-south road in the new city area in the east, connecting Avenida Deolinda Rodrigues (Radial Route 3), Hoji Ya Henda (Radial Route 4), and Ngola Kiluanji (Radial Route 5) to one another. Furthermore, it serves as an important access route for a number of factories along the route.

This route also serves as an important connecting road for traffic bound for the eastern suburb

Biana and northern Luanda industrial area without having to pass through the center of the city.

Estrada da Conduta

This route runs east and west through the new city area in the east, connecting Quinta Avenida and General Monteiro Libeiro. In this area, there are no other routes which serve as effective bypasses, therefore with the completion of this route traffic will no longer need to pass other arterial routes and interconnection of communities can be conducted more efficiently.

In addition, this route passes parallel with Ngola Kiluanji, a heavily-traveled and congested urban radial route and will serve as a bypass for it.

Rua Sanatorio-Barrio Popular

This route is an east-west road passing through the southeast of the new city area. At the eastern end of the route is a sanatorium, large factory, police academy, etc., and residences are built along the route. As there are no effective roads presently connecting these various facilities, the completion of this route will offer highly improved access to these and bring greater convenience to the lives of local citizens.

Estrada Golfe-Futungo

The official function of this route is as a ring route, and runs east and west south of the airport, which is south of the city. In the future, this will be part of a ring route outside of Quinta Avenida and will be classified as an arterial route. At present it is a primary road as part of the Luanda Sul Project, in which factories and residences are being constructed and population as well as vehicle volume is on the increase. Its improvement will have many favorable economic and social effects on the community.

The effects of each of the above-mentioned routes will benefit the economy as well as the lives of the citizens of Luanda in the following ways:

- ① Besides connecting the radial routes to one another, the routes will provide access to residential and commercial areas as well as bring about a reduction in shipping costs and time, thereby vitalizing the economic activities of Angola.
- ② Rehabilitation of sections of road which became impassable in the rainy season will prevent economic loss
- 3 Medical and other public facilities will become more easily accessible, improving the quality of life for citizens
- The radial routes emanating from the center of Luanda run parallel to heavily-traveled routes, thereby serving as bypasses and mitigating congested traffic conditions.

(5) The construction of these routes will improve on unfavorable present conditions such as trash dumping, dustiness, water puddles, etc. which degrade local living conditions and prevent passage of traffic.

Through this project, enormous beneficial effects are expected and it has been verified to be appropriate as a recipient of grant aid cooperation. Furthermore, the Angolan government has shown that it is capable of maintaining and operating the project routes in terms of personnel and budget. In light of these factors, the early realization of this project is anticipated.

4-2 Coordination with Other Technical Cooperation Projects and Donors

The following assistance is being carried out in the road sector by the World Bank.

The "Boavista Area Cliff Stabilization Project" is planned in an area which was removed from the project (north side of Rua da Camara densely inhabited by refugees) to be carried out with EU funds. As the project will be taking place next to the project in this report, and in view of the fact that a large number of residences will be removed, various considerations will need to be taken.

4-3 Issues

For the effective and efficient implementation of this project, residences which have been built upon planned road areas will need to be removed by the Luanda government. Furthermore, in order to maintain road function, maintenance must be carried out on a regular basis; therefore the Direcção de Serviços de Infraestructuras e Obras of the provincial government, which is in direct charge of maintenance, should carefully plan budgets as shown in item P3-18.

APPENDIX

Appendices

- 1. Member List of the Survey Team
- 2. Survey Schedule
 - 2-1 For Basic Design
 - 2-2 For Discussion of Draft Final Report
- 3. List of Party Concerned in Angola Govt.
- 4. Minutes of Discussion
- 5. Study Data
 - 5-1Site Inspection Result
 - 5-2Soil Survey Result (CBR Test)

Appendix 1 Member of Study Team and Organization

1-1 Basic Study Team

Name	Position	Organization
Mr. Katsuyoshi SUDO	Team Leader	Administrative Division,
		Training Affairs Department,
		Japan International Cooperation Agency
Mr. Toru Shimoda	Project Coordinator	Second Project Study Division,
	<u> </u>	Grant Aid Project Study Department,
		Japan International Cooperation Agency
Mr. Akihiko Hirotani	Chief Consultant/	Executive Director,
	Transportation Planning	Oriental Consultants Co., Ltd.
Mr. Hiroo Takeda	Road Designer	Chief Engineer,
		Oriental Consultants Co., Ltd.
Mr. Akio Shikano	Natural Condition Surveyor	Chief Engineer,
	-	Oriental Consultants Co,. Ltd.
Mr. Masami Fukuda	Construction Planning/	Project Director,
	Cost Estimator	Oriental Consultants Co., Ltd.
Mr. Hiroaki Watabe	Language Translator	Oriental Consultants Co., Ltd.

1-2 Draft Final Report meeting

Name	Position	Organization
Mr. Hayao Adachi	Team Leader	JICA expert, Japan International Cooperation Agency
Mr. Akihiko Hirotani	Chief Consultant/ Transportation Planning	Executive Director, Oriental Consultants Co., Ltd.
Mr. Masami Fukuda	Construction Planning/ Cost Estimator	Project Director, Oriental Consultants Co., Ltd.
Mr. Hiroaki Watabe	Language Translator	Oriental Consultants Co., Ltd.

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2-2 Schedule on Draft Final Report Discussion

No of days	Date	Transportation	Stay	Activities
1	8/6/98(Mon.)	Flight JL405 Narita – Paris	Paris	Transportation
2	8/6/98(Tue.)		Paris	Application for Visa
3	8/6/98(Wed.)	Flight AF928 Paris -	Airplane	Transportation
4	8/6/98(Thu.)	- Luanda	Luanda	/Courtesy call to Provincial Government of Luanda (Infrastructure & Works Service Directorate)
5	8/6/98(Fri.)		Luanda	/A meeting with Provincial Government of Luanda (Infrastructure & Works Service Directorate)
6	8/6/98(Sat.)		Luanda	/Site Inspection with an attendance from Infrastructure & Works Service Directorate
7	8/6/98(Sun.)		Luanda	/An In-house Meeting /Arrangement of Materials
8	8/6/98(Mon.)		Luanda	/A meeting with Provincial Government of Luanda (Infrastructure & Works Service Directorate) /Visiting and Meeting with UTACE A meeting with NTTI
9	8/6/98(Tue.)		Luanda	/Visiting to UNDP and hold a meeting /A meeting with Provincial Government of Luanda (Infrastructure & Works Service Directorate)
10	8/6/98(Wed.)		Luanda	/Signing on Minutes of Discussions
1.1	8/6/98(Thu.)			/A meeting with Provincial Government of Luanda (Infrastructure & Works Service Directorate) /A meeting with IBRD
12	8/6/98(Fri.)	Flight DT587 Luanda – Harare		/Transportation /A courtesy call to Japanese Embassy and JICA
13	8/6/98(Sat.)	Flight UM361 Harare - Johannesburg		/Transportation
14	8/6/98(Sun.)	Flight JL 712 Singapore – Narita		/Transportation

Appendix-3 List of Party Concerned in Angola Govt.

lo. Member	Position/Division/Ministry
1 Dr. Jose Alberto Puna Zau	Vice Ministro/
	MINOPU(Ministerio das Obras Publicas e Urbanismo)
	Director/
2 Dr. Manuel Antonio Paulo	Gabinete de Estudos e Analises/
	MINOPU(Ministerio das Obras Publicas e Urbanismo)
	MINOPO(Ministerio das Obras Publicas e Orbanismo)
3 Dr. Wola N'teni-a-Mambu	Gabinete de Planeamento e Estudos/
	MINOPU(Ministerio das Obras Publicas e Urbanismo)
45	Vice Governador/
4 Dr. Arquitecto Antonio Goma	vice Governation/
	Governo Provincial de Luanda
5 Dr. Afonso Luviluko	Director/
	DSIO(Direcção dos Servicos das Infraestruturas e Obras)/
	Governo Provincial de Luanda
6 Mr. Gabriel Nongo Likita	Eng./
	DSIO(Direccao dos Servicos das Infraestruturas e Obras)/
	Governo Provincial de Luanda
7 Mr. Virgilio Diedade Estote	Eng./
	DSIO(Direccao dos servicos das Infraestruturas e Obras)/
	Governo Provincial de Luanda
8 Mr. Jose A. de Sousa Mesquita	Eng.
	DSIO(Direccao dos Servicos das Infra-estruturas e Obras)
	Governo Provincial de Luanda
9 Ms. Dona Tereza Maola	Conselheira/
	Direccao Asia e Oceania/
	MIREX(Ministerio das Relacoes Exteriores)
10 Mr. Manimo Simao	Tecnico Superior/
	Direccao Asia e Oceania/
	MIREX(Ministerio das Relacoes Exteriores)
11 Mr. Faustino dos Santos Lourenco	Eng./
	UTA-CE(Uniao Tecnica Administrativa)
12 Dr. Michel Balima	Deputy Representative/
	111100
13 Mr. Waldemar Pires Alexandre	UNDP Director/
15 Mr. Waldemar Fires Alexandre	Construction Services
1	Instituto de Estrada de Angola
14 Mr. Helder Eugenio da Silva Cruz	General De-Mining Project Manager
14 par. Heider Edgettio da Sava Oruz	INAROEE(Instituto Nacional de Remoção de Obstaclos e
	Engenhos Explosivos)
15 Mr. Carlos Baptista	Chefe, Departamentos de Contencioso e Ouviduria
TOTAL CALLOS DAPUSTA	Governo de Luanda

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Appendix 4 Minutes of Discussion

MINUTES OF DISCUSSIONS

ON

THE BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

IN

THE REPUBLIC OF ANGOLA

(Consultation on the Draft Basic Design)

The Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched to Angola the Basic Design Study Team on the Project for Improvement of Road Network in Luanda in the Republic of Angola (hereinafter referred to as "the Project") in February 1998. As a result of the series of discussions, field surveys in Angola and technical examination in Japan, JICA prepared the Draft Basic Design on the Project.

In order to explain and discuss with the Government of Angola the components of the Draft Basic Design, JICA sent to Angola the Draft Basic Design Explanation Team (hereinafter referred to as "the Draft Team"), headed by Hayao Adachi, Development Specialist, Institute for International Cooperation, JICA, and scheduled to stay in the country from June 11, 1998 to June 19, 1998.

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

Mr. Hayao Adachi

Leader

Draft Basic Design Explanation Team Japan International Cooperation Agency Luanda, June 17, 1998

Mr. Carlos Mateus José

Director

Direcção Nacional de Infraestructuras Ministério de Obras Públicas e Urbanismo

Mr. Afonso Luviluku

Director

Direcção de Serviços de

Infraestructuras e Obras

Governo Provincial de Luanda

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ATTACHMENT

1. Major Components of the Draft Basic Design

The Government of Angola has agreed and accepted in principle the major components of the Draft Basic Design proposed by the Draft Team, including the following stages.

1st STAGE (7.3km)

Rua Senado da Camara (2.5km) Acesso a ETA-Marçal (0.3km) Quinta Avenida (4.5km)

2nd STAGE (10.9km)

Quinta Avenida (0.6km)

Estrada da Conduta (1.3km)

Rua Sanatorio-Bairro Popular (Rua Olimpio Makueria) (2.8km)

Estrada Golfe-Futungo (6.2km)

2. Responsible Agency and Implementing Agency

Ministerio de Obras Publicas e Urbanismo (MINOPU) is the Responsible Agency, and Governo Provincial de Luanda (The Provincial Government of Luanda) is the Implementing Agency of the Project.

3. Management and Maintenance

Governo Provincial de Luanda (The Provincial Government of Luanda) will maintain and use properly the facilities constructed under the Project and assign the necessary staff for operation and maintenance of them.

4. Japan's Grant Aid System

- The Government of Angola has understood the system of Japan's Grant Aid Program described in ANNEX-1 and explained by the Draft Team.
- 2) The Government of Angola will take necessary measures described in ANNEX 2 for smooth implementation of the Project on the condition that the Grant Aid
 1 from the Government of Japan is extended to the Project.

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5. Further Schedule of the Study

The Draft Team will make the Final Report in accordance with the confirmed items and send it to the Government of Augola around August 1998.

6. Major Points of Discussions

Both sides agreed in principle the major points of discussions as follow;

- As to the implementation of the 1st stage construction, the removal of houses and clearing of project sites shall be completed by the Angolan side by the beginning of December, 1998.
- 2) Relocation of houses for the 2nd stage construction shall be agreed by the people concerned by the beginning of December, 1998. Actual implementation shall be subject to removal of houses and clearing of project sites by the Angolan side.
- 3) The Angolan side will allocate enough budget to secure the proper operation and maintenance of roads and ancillary facilities such as street lightings, traffic signals and signs.
- 4) Concept of road drainage system proposed in the Draft Basic Design was explained and confirmed sufficient.
- 5) The height of kerb shall be 30cm in principle to prohibit vehicles driven over it.
- 6) The Angolan side shall conduct prior to this Project any necessary works on facilities such as sewage system, electric and telecommunication system, etc. to avoid damage on completed roads under this Project.

7)Footpath Width

Width of footpath at the standard cross section of the Draft Basic Design shows maximum and can be reduced to accommodate irregular boundary of housings.

8) Alignment of Roads

Horizontal alignment of roads in the Draft Basic Design shall be shifted slightly to avoid removal of some houses. Those houses which can not be avoided by these measures shall be removed by the Angolan side.

7. Training Request

The Angolan side made a strong request to JICA to accept a training program in Japan for this Project and the Draft Team promised to convey the request to the headquarters

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ANNEX-1 JAPAN'S GRANT AID SYSTEM

1. Grant Aid Procedures

1) Japan's Grant Aid System 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 the Japanese Cabinet)

Determination of Implementation (The Notes exchanged between the

Governments of Japan and the recipient country)

2) Firstly, a request for the Grant Aid 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 to conduct a study on the request.

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

Thirdly, the Government of Japan appraises the project so as to see whether or not it is suitable for the Grant Aid, basing on the Basic Design Study report prepared by JICA, and then it is submitted to the Cabinet for approval.

Fourthly, once the project is approved by the Cabinet, its implementation is officially determined by signing the Exchange of Notes between the Governments of Japan and of the recipient country.

Finally, in the course of implementation of the project, JICA will take charge of expediting the execution of the project by assisting the recipient country in such matters as preparing tenders, contracts and so on.

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2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study, conducted by JICA on the requested project, is to provide basic documents necessary for the appraisal of the project by the Government of Japan. The contents of the study are as follows:

- a) to confirm the background, objectives and benefits of the project and also institutional capacity of the agencies concerned of the recipient country necessary for the project implementation;
- to evaluate the appropriateness of the project from the technical, social and economic points of view;
- to confirm items agreed on by both parties concerning the basic concept of the project;
- d) to prepare a basic design of the project; and,
- e) to estimate costs 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 through 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 in the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the study, JICA selects a consultant among those who registered at JICA by evaluating competitive proposals submitted by those consultants. The selected consultant carries out the Basic Design Study and prepare a report based on the terms of reference made by JICA.

At the beginning of the implementation after the Exchange of Notes, JICA recommends the same consultant who participate in the Basic Design Study to the recipient country for the services of Detailed Design and construction

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supervision of the project in order to maintain the technical consistency between the Basic Design and the Detailed Design.

3. Japan's Grant Aid Scheme

1) What is the Grant Aid?

The Grant Aid Program 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. Grant Aid is not supplied through the donation of materials as such.

2) 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.

3) Period

The period of the Grant Aid means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure 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 weather, 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.

4) Purchase of Products and Services

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, contracting or 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.)

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5) 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.

- 6) 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:
 - (1) to secure land necessary for the sites of the project prior to commencement of the construction;
 - (2) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
 - (3) to secure buildings prior to the procurement in case the installation of the equipment;
 - (4) to ensure all the expenses and prompt execution for unloading, customs clearance at the ports of disembarkation and internal transportation of the products purchased under the Grant Aid;
 - (5) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts;
 - (6) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their works.

7) Proper Use

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

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8) Re-export

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

9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments to the Bank 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 issued by the Government of recipient country or its designated authority.



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ANNEX-2 UNDERTAKINGS REQUIERED OF THE GOVERNMENT OF ANGOLA

In addition to the undertakings mentioned in the section 3. 6) of ANNEX-1, following necessary measures shall be taken by the Government of Angola on condition that the Grant Aid by the Government of Japan is extended to the Project.

- to secure construction areas (including removal of the occupying houses) necessary for the Project;
- 2. to remove the existing electric lines affecting the road construction;
- 3. to bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and other payment commissions;
- 4. to provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary; and,
- 5. to bear all the expenses other than those covered by the Grant Aid, necessary for the Project.





Appendix 5 Study Data

5-1 Site Inspection Result

1. Rua Senado da Camara

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

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STIGATION D	start of	Rua de 19 I-L	0	Baovista	Baovista	0.9m		13.2m			0.9m	about 15m	ш	a		L.	01	00	OU	service line	ou	no	92	no	no	industry	indystry
rory inves			VCE	LEFT	RIGHT	SW	SHLD	C/W	S C S	SHLD	SW	VIDTH	TYPE	CONDITION	<u></u>		LEFT	RIGHT	TURE	LEFT	RIGHT	z	MARKING	LIGHTING	ĒR.	LEFT	RIGHT
ROAD INVENTORY INVESTIGATION DATA SHEET DATE 4/3/'98 INSPECTOR S.Imai	ROAD NAME	Senado da Camara	DISTANCE	INTERSECTING	ROAD		LEFT	CROSS	SECTION	RIGHT	-	RIGHT OF WAY WIDTH	ROAD	Щ	ESSI	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES	SIGN	ROAD	FURNITURE LIGH		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

INVESTIGATION DATA SHEET	Y INVESTIGATION DATA SHEET INSPECTOR S.Imai INSPECTOR H INSPECTOR S.Imai cristano - start of dos Santos	akeda SHEET No. 2	O.	Udunduma	1650																							
INVESTIGATION DATA SHEET INSPECTOR S.Imai	ME	INSPECTOR H.Takeda	end of	חק				1.15m	2.50m		√ 14.90m		4.05m	22.6m	4	ш		Ľ.	OU	οu	OU	service line	ou	no	ou	both side	Ou	
ORY INVESTIGATION D. INSPECTOR INSPE	A INVENTORY INVESTIGATION D. 4/3/98 INSPECTOR	ATA SHEET S.Imai		SC	00			2.45m		} me.e ∖		3	2.50m	about 15m	А	В		u .	no	ou	no	service line	ou	priority road	no	right side	ou	
ORY INVE CAW CAW CAW CAW CAW CAW CAW CAW CAW CA	A INVENTORY INVENTORY INVENTORY INVENTORY INVENTOR AND AND AND AND AND AND AND AND AND AND	STIGATION DA				Houari-	Boumedienne		C	~~~		3										•		<u>a</u>				
. c	A LEFT LEFT LEFT LEFT LEFT LEFT LEFT LEFT CON SIGI	ORY INVE			SCE	LEFT	RIGHT	N/S	SHLD	CV	S/S	<u>L</u> _	SW	VIDTH	TYPE	NDITION	7		LEFT	RIGHT	URE	LEFT	RIGHT		KING	TING	ER	

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

က			1000+1650	A Comandante	Valodía	squater	garbage					26.5m	Ш	LL		8	ou	no	ou	ou	ဝို့	000	no	90	ou	apartment	apartment
SHEET No.			800+1650			squater						24.8m	ш	u.		lL.	OU	000	OU	ou	000	oc.	OL	on O	o	house	house
	access to	ETA	730+1650		Pasture																						
4. Takeda		1	600+1650			squater	-					about 25m	ш	u.		u.	ou	ou	ou	ou	no	00	ou Ou	ou	ou	house	car park
INSPECTOR H.Takeda			550+1650	Ngola	Kiluanji																						
=			400+1650									about 30m	Э	μ.		В	ou	ou	ou	no	ou	ou	ou	00	οu	open space	aprtment
DATA SHEET S.Imai			200+1650			squater	-	:		20 10-		14.1m	ш	u.		æ	ou	οu	MH	ou	no	ou	ou	ou	ou	house	aprtment
ROAD INVENTORY INVESTIGATION D 1 4/3/'98	start	project section	0+1650	Lueji Ankonda	Ndunduma	squater						24.3m	ш	ц.		IL.	ou	ditch	οu		ou	ou	OU	ou	ou	house	street
ORY INVES			핑	LEFT	RIGHT	WS.	SHLD	ν C/W	C/W	SHLD	s/w	IDTH	TYPE	CONDITION	<u></u>		LEFT	RIGHT	URE	LEFT	RIGHT	-	MARKING	LIGHTING	ER	LEFT	RIGHT
INVENT 4/3/'98	IME	Samara	DISTANCE	ING			LEFT			RIGHT		= WAY W		S	ESSIBILI	ROFILE			STRUCT			SIGN	MAR		OTHER		
ROAD DATE	ROAD NAME	Senado da Camara		INTERSECTING	ROAD			CROSS	SECTION			RIGHT OF WAY WIDTH	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

4			00 800+3100			4.5m	<i>C</i>	√ 9.3m		١	E (1.6m)	Ę,	A	u.		u.	river	00	00	92	000	00	92	20	no	river	ware house ware house
SHEET NO.			600+3100			5.0m		5.2m		١٢	E (1.6m)	놐	4	ц		ı.	river	2	ou	ou	ou	2	ou	ည	ou.	river	ware hous
			400+3100			1.5m		9.0m			E (3.6m)	ş	4	u.		LL.	river	ou Ou	ou	ou	on O	ou	ou	00	ou	river	house
H.Takeda			200+3100			4.2m		\$.10m			E (4.10m)	αķ	Ą	u_		Ľ.	river	ou	ou	ου	OU	ou	٥u	ou	no	river	Super M
INSPECTOR H.Takeda	star of	pavement	0+3100	Нојі Үа	Henda	car park		9.20m			3.0m	uk	Ą	4		u.	no	no	HM	ou	no	ou	ou	ou	ou	parking lot	public office
	at Hoji Ya	Henda	1450+1650	А Нојі Үа	Henda	squater						about 30m	Ш	u		ш	ou	ou	ou	no	OU	ou	no	οU	ou	house	ļ <u>+</u>
ATA SHEET S.Imai			1400+1650			squater					7.1m	28.9m	Ш	Ľ.		ш	ou	ditch	no	οu	OU	no	ou	ou	OU	house	house
TIGATION D			1200+1650		local	squater					squater	19.5m	m	u.		և	00	00	ou	OU	οu	OL	OU	ou	٥Ľ	apartment	anament.
TORY INVES		J	NCE	LEFT	RIGHT	SW	SHLD	Š	S/S	SHLD	l	MIDTH	TYPE	CONDITION	117		LEFT	RIGHT	LURE	LEFT	RIGHT	Z	MARKING	LIGHTING	OTHER	LEFT	THUIG
ROAD INVENTORY INVESTIGATION DATA SHEET DATE 4/3/'98	ROAD NAME	Senado da Camara	DISTANCE	INTERSECTING	ROAD		LEFT	CROSS	SECTION	RIGHT		RIGHT OF WAY WIDTH	ROAD	SURFACE	S	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES	Sign	ROAD	끭		EXISTING	30110110

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

8			900+4150	Estrada -	Ngola Bamdi																						
SHEET No.	:		800+4150		Z							open space	ш	ത		u.	00	00	ou	υo	ou	ou Ou	ou	000	00	open space	open space
			600+4150									open space	ш	۵		u.	00	ou	00	ou	ou	ou	00	ou	ou	open space	river
H.Takeda			400+4150									open space	ш	В		LL.	οu	OU	OU	no	no	00	ou	on on	ou	open space	river
INSPECTOR H.Takeda			200+4150									open space	ш	മ			river	no	no	du	ou	ou	no	no	ou	river	police HQ
			0+4150	Deolinda -	Rodorigues								۵	В			river	no	ou	du	ou	οu	ou	ou	ou	river	police HQ
ATA SHEET S.Imai	end of	project section	1050+3100	Deolinda -	Rodorigues							randabout							a-14 14								
ROAD INVENTORY INVESTIGATION DATA SHEET 5/3/'98 INSPECTOR S.Imai	9		1000+3100			2.2m, eroding		7.3m		,	E (2.4m)	υk	٨	Ŀ		L.	river	no	υo	du	OC.	00	no	0.0	OU	river	ware house
ORY INVES			33	LEFT	RIGHT	SW	SHLD	χS	χ	SHLD	s/w	IDTH	TYPE	CONDITION	>		LEFT	RIGHT	JRE	LEFT	RIGHT		MARKING	LIGHTING	ER	LEFT	RIGHT
NVENT(5/3/'98	1E	amara	DISTANCE	20			LEFT			RIGHT		WAY W		CON	SSIBILIT	OFILE			TRUCT			SIGN	MAR	191	OTHER		
ROAD 1	ROAD NAME	Senado da Camara		INTERSECTING	ROAD			CROSS	SECTION			RIGHT OF WAY WIDTH	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

ဖ	end of	S. Camara	1000+5050	A.Dr.Moise	Alves de Pinho	squater					squater	about 15m	ш	ω		u.	000	00	00	900	ou	00	or	no	ou	house	house
SHEET No.			800+2050			squater					squater	about 15m	Ш	œ		ц	0	o C	ou	000	0	000	no	oc.	οu	house	house
i			600+5050			squater					squater	about 7m	Ш	മ		L	no	ou	000	ou	ou	ou	ဝို	ou	ou	house	house
J. Takeda			400+5050			market				- ^ -	market	about 7m	ш	8	***	L	ou	ou	ou	no	٥Ľ	ou	no	OU	no	house	house
INSPECTOR H.Takeda			350+5050	corner		market		-			market	about 7m	ш	В		F	no	no	no	no	ou	ou	ou	٥c	ou	house	house
_			200+5050			squater					squater	6.75m	ш	60		Œ	00	ло	o C	ou	no	ou	ou	υo	00	house	house
S.Imai			0+2050	Estrada -	Noola Bamdi	squater					squater	11.7m	ш	æ		ш.	00	٥Ľ	ou	no	00	ou	ou	00	00	house	house
ROAD INVENTORY INVESTIGATION DA			900+4150	Estrada	i	 -																					
ORY INVES		I	H.C.	1331	FHUI	N/S	SHLD	Š	CW	SHLD	w/s	VIDTH	TYPE	CONDITION	<u></u>		LEFT	RIGHT	URE	LEFT	RIGHT	7	MARKING	LIGHTING	ER	LEFT	RIGHT
INVENT	20.00	ָרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּיִרְיִּבְּי	DISTANCE	TIME)		LEFT			RIGHT		RIGHT OF WAY WIDTH			ESSIBILI	ROFILE			STRUCT			SIGN	MAF	•			- 22
ROAD			Seriado da Carriara	SMITCHSECTING				CROSS	SECTION			RIGHTO	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

Ver.1.1 Mar/98

Constructed Year Canada		1	2/100 002	AT TIMEM	OVE	Inspection Date:	3/3/'98			No. 5
Nos. of CNV	Detailed I	nspection Sheet	TOK TAVE	No. Paris	25.25		Engineer	Engi	neer	Inspector
Damage type Caching Ratio Caching Ratio Caching Ratio Caching Ratio Damage type Signatural Design (Stavelle Caching Ratio Damage type Signatural Design (Stavelle Caching Ratio Damage type Signatural Damage type Signatural Caching Ratio Caching Damage type Signatural Caching Depth Caching	(Senone)		km to	1.7	km			- - -		
Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Constructed Year: Congress (4)Earth	oeneral Information	Rd Class Sec. Ar		os. of C/W	1		S.Imai	Н. Гакеда		
Inspectors: Constructed Year: Inspectors: Constructed Year: Danage type 3 (1)settlement (2)cacking olyeque (s)Ruting (s)Ravelin Crecking Ratio D = 15 E		Direction: Bao v		o Naundum	a Design S					
Damage type 3 (1)Settlement (2)Cacking (5)Ravier (6)Ravier (5)Ravier (6)Ravier (5)Ravier (6)Ravier (6)		Inspectors:		Constru	sted Year:		0 2 4 5 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		30	%
Pavement 1(1)Asphalit (2)Surface treated (3)Card (4)Earth Cong Rough Card Solid Card C		Damage type	3 (1)Settleme	ent (2)Cracking	(3)Pothole (4)	Wave (5) Kutting (6) Kaver	Disting Donth	R C	15	mm
Terrrain		Pavement	1 (1)Asphall	t (2)Surface ti	eated (3)Grav	rei (4)Earth	רווווון הפקיווו	1 8	6	mm
Soil	Inspection	Terrrain	5 (1)Mount (2)Hill (3)Flat	(4)Swampy (5	Town]	Long Kougn		4000	
Drainage pipe		Soil	6 (1) Rock (2)Gravel (3)S.	and (4)Silt (5)	Clay (6)Other(Potholes Nos.		Depai Ave.	
Caround Water 4 (1)Flow (2)Seepage (3)Wet (4)None Caround Water 4 (1)Flow (2)Seepage (3)Wet (4)None Caround Water 1/10 Commercial Co	- Method	Drainage pipe	Diameter	m	n Concrete, S	teel, Othe(Diameter		0000	mm
Land Use and right commercial General Remark Dad, almost Land Use and right commercial Land Use and right commercial Land Use and remark Grade Crade C		Cround Mater	4 (1)Flow (2	Seepage (3)	Wet (4)None		Ave		0007	11866
Survey Point		Spould water	right	commercia	16		General Remark		bad, almosi	t broken
Survey Point 1 km 410 m to 650 m (incl. subgrade) O II I km 410 m to 650 m I km		Laid Oscand	t d	commercia	1			remark	Grade	
Survey Point 1 km 410 m to 650 m (inci.subgrade) O III F (earth) E B 14.9m		Environment					Judgement		ı,	Reconstruction
Survey Point Kiff 410 m to 650 m m m m kiff kight kigh		,	1				(Incl.subgrade)	0	Ħ	Overlay
F (earth) E B		Survey Point	E X	***	1	650 m	· -		Ħ	Surface Treatment
F (earth) E B 14.9m F (earth) 1.15m 2.5m 14.9m 4.05m 4.15m 2.5m 14.9m 4.05m A.2 Platform width F: Foot path width B: Carraigeway width G: Crossfall C:D: Traffic lane width H: Median width E: Shoulder width E: Shoulder width			+	-	=		1		2.	no Repair needed
F (earth) E B 14.9m 1.15m 2.5m 14.9m A; Platform width F: Foot path width B: Carraigeway width G: Crossfall C:D: Traffic lane width E: Shoulder width								Photogra	ph	
A; Platform width F: Foot path width C:D: Traffic lane width H: Median width E: Shoulder width		F (earth) E	ω,			F (earth)				
A; Platform width F: B: Carraigeway width G: C:D: Traffic lane width H: E: Shoulder width		1.15m 2.5m		14.9m		4.05m				
A; Platform width F: B: Carraigeway width G: C:D: Traffic lane width H: E: Shoulder width						- A				
A; Platform width F: B: Carraigeway width G: C:D: Traffic lane width H: E: Shoulder width	Cross									
Platform width F: Carraigeway width G: Traffic lane width H: Shoulder width	Section									
Platform width F: Carraigeway width G: Traffic lane width H: Shoulder width				- -						
Platform width F: Carraigeway width G: Traffic lane width H: Shoulder width										
Platform width Carraigeway width Traffic lane width Shoulder width		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-							
Platform width F: Carraigeway width G: Traffic lane width H: Shoulder width				. =						
Platform width F: Carraigeway width G: Traffic lane width H: Shoulder width	-									
Carraigeway width G: Traffic lane width H: Shoulder width			4 4 1 1	ů.	Foot path y	vidth				
Traffic lane width Shoulder width			in wider www.width	: <u>छ</u>	Crossfall					
			lane width	ï	Median wic	II				
			er width							

Site Photograph

Road Name:

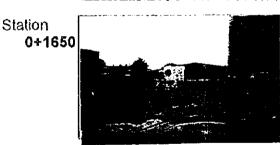
(1/3)

Senado da Camara Photograph taken by: H. Takeda 5/3/98 Date: Station Station 1200 Station Station 200 1400











Station







Station

Station

Site Photograph (2/3)Road Name: Senato da Camara 5/3/98 Photograph taken by: H. Takeda Date: Station Station 200+3100 600+1650 Station Station 400+3100 800+1650 Station Station 600+3100 1000+1650 Station Station 800+3100 1200+1650 Station Station 1000+3100 1400+1650 Station Station 0+4150 0+3100

Site Photograph Road Name: (3/3)Senato da Camara H. Takeda Photograph taken by: 5/3/98 Date: Station Station 400+5050 200+4150 Station Station 600+5050 400+4150 Station Station 800+5050 600+4150 Station Station 1000+5050 800+4150 Station Station 0+5050 Station Station 200+5050

2 Quuinta Avenida

BASIC DESION STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

+			1200	local	20	E (3.0m)		9.25m			E (3.0m)	15.25m	A	ıL		u.	oc.	oc.	on O	OU O	service line	9	no	on the left	oc Oc	market	market	
SHEET No.			1000	ou	92	E (3.0m)		9.25m			E (3.0m)	15.25m	4	L		u.	ou	ou	ou	ou	service line	ou	no	00	no	industry	house	
			800	ou	ou	E (3.0m)		9.25m			E (3.0m)	15.25m	٨	u		U.	ou	ou Ou	ou	ou	service line	ou	ou	on the left	ou	industry	house	
H.Takeda			650	Avenida	Conduta								Ш	В		t.	ou	ou	no	no	service line	ou	ou	no	no	industry	house	
INSPECTOR H.Takeda			009	ou	ou							15.0m	Ш	8		L.	ou	ou	ou	ou	service line	οu	no	ou	οu	house	house	
			400	ou	ou							14.2m	ш	ထ		L	ou	ou	ou	ou	service line	ou	ou	no	ОU	house	house	
ATA SHEET S.Imai			200	ou	ou						squater	about 15m	ш	ш		u	no	or	or	90	service line	υn	2	ou	oc Oc	house	house	
ROAD INVENTORY INVESTIGATION DATA SHEET 3/3/98	starting	point	0	Ngola Kiluanji	Ngola Kituanii			railway	crossing			about 15m	u	m		slope	ဝို	oc C	or	service line	service line	90	oL OL	oc	90	house	house	
ORY INVES		-=			LEFT	RIGHT	SW	SHLD	Š	CW	SHLD	s/w	IDTH	TYPE	CONDITION	_		LEFT	RIGHT	LRE L	LEFT	RIGHT	1	MARKING	LIGHTING	띴	LEFT	RIGHT
JAVENTO	AME	nida	DISTANCE	TING			LEFT			RIGHT		RIGHT OF WAY WIDTH			FSSIBIL!	ROFILE			STRUCT			SIGN	MAR		-			
ROAD DATE	ROAD NAME	Quinta Avenida		INTERSECTING	ROAD			CROSS	SECTION			RIGHTO	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE	

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

ROAD INVENTORY INVESTIGATION DATA SHEET

2600 service line E (3.5m) E (3.5m) 15.50m industry 8.50m house è 8 è 9 2 6 ç è 6 ç ⋖ u. 2400 service line | service line | service line | SHEET No. E (3.5m) E (3.5m) 15.50m industry 8.50m market 6 ę è 6 6 6 0 2 6 è ß 4 bad pavement 2300 E (3.5m) E (3.5m) 8.00m 15.00m house house 9 ç 2 ဝို ô 6 8 5 6 9 ব 00 start of 2200 E (3.5m) E (3.5m) 8.00m 15.00m house house **INSPECTOR H.Takeda** 9 è 6 00 ô ç 0 2 ဥ 6 $\mathbf{\omega}$ ব u 2000 E (3.0m) 15.00m E (3.0m) 9.15m house house пo 2 6 0 6 6 5 2 5 Ø ⋖ 1800 service line E (3.0m) industry E (3.0m) 15.10m industry 9.15m 6 5 6 ဥ ou 2 ဥ 2 6 2 Ö 4 1600 service line E (3.0m) E (3.0m) industry 15.10m 9.10m house 2 6 9 6 00 2 è ŝ င္င ê O Þ INSPECTOR S.Imai 1400 service line industry E (3.0m) E (3.0m) industry 15.10m 9.10m 6 è 9 ê 6 ê Š ၉ ŝ 2 O ⋖ u. RIGHT RIGHT SHLD RIGHT SHLD TYPE RIGHT LEFT CV Sign LEFT LEFT SZ SS LEFT CONDITION RIGHT OF WAY WIDTH MARKING LIGHTING DRAINAGE STRUCTURE DISTANCE OTHER ROAD ACCESSIBILITY SIGN RIGHT EXISTING PROFILE 3/3/98 EFT NTERSECTING ROAD NAME Quinta Avenida SURFACE FURNITURE LAND USE DRAINGE UTILITIES SYSTEM EXISTING SECTION EXISTING CROSS ROAD ROAD ROAD

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

8			3300	٤	င္	garbage						충	ш	u.		u.	2	စ္	2	8	service line	2	90	2	2	house	house
SHEET No.			3600	ou	no Ou							αķ	ш	u.		L.	ou	ou	ou	ou	service line se	ou	ou	no	no	house	house
S			3400	ou	no							17.70m	ш	u.		IL.	or O	ou Ou	no	ou	service line	no	ou	٥٢	ou	house	house
.Takeda			3250	Rua 11	Rua 11																S						
INSPECTOR H.Takeda			3200	no	ou	E (3.9m)		7.30m			E (5.1m)	16.30m	A	L.		L.	ou	ou	no	οu	service line	no	no	no	no	house	river
=			3000	ou	ou	E (5.0m)		7.30m		`		about 16m	٨	L		LL.	ou	no	no	no	service line	ou	ou	ou	OU	house	house
TA SHEET	former	end of project	2800	ou	locat	E (5.0m)		7.30m		,		about 16m	4	L		L	ou Ou	ou	ou	ou	service line s	00	ou Ou	OL	92	house	house
TIGATION DA	¥	e)	2650	on On	Rua de Brazil																						house
ORY INVEST			33	LEFT	-		SHCD	C/W	C/W	SHLD	S/W	ETH	TYPE	CONDITION	 		LEFT	RIGHT	JRE	LEFT	RIGHT		MARKING	LIGHTING	χ.	LEFT	RIGHT
ROAD INVENTORY INVESTIGATION DATA SHEET	ROAD NAME	Quinta Avenida	DISTANCE	INTERSECTING	Ω		LEFT	SS	NO NO	RIGHT		RIGHT OF WAY WIDTH	Q	:	ISSI	EXISTING PROFILE	IGE	EM	DRAINAGE STRUCTURE	NG	IES	SIGN	•			NG	JSE
RC DATF	ROAI	 Quinta,		INTERS	ROAD			CROSS	SECTION			RIGH	ROAD	SURFACE	ROAD A	EXISTIN	DRAINGE	SYSTEM	DRAINA	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

ROAD INVENTORY INVESTIGATION DATA SHEET 3/3/'98 INSPECTOR S.Imai		point	DISTANCE 4000 4200 4400 4600 4800 5000 5100	ING LEFT no no no Deolinda	RIGHT no no no Rodorigues	S/W garbage garbage squater squater		C/W	C/W crossing	RIGHT SHLD	S/W squater squater	: WAY WIDTH 15.3m 12.0m 11.2m about 12m about 12m about 12m	TYPE E E E E	CONDITION B B B B B	SSIBILITY	R F F F F F Slope slope	LEFT no no no no no	RIGHT no no no no no	STRUCTURE no no no no no	LEFT no no no no no	RIGHT no no no no	SiGN no no no no no	MARKING no no no no no	LIGHTING no no no no no	OTHER no no no no no	LEFT house house house house house	
ROAD INVENTORY DATE 3/3/'98	ROAD NAME	Quinta Avenida	DISTANCE	INTERSECTING L	ROAD		L	CROSS	SECTION	L		RIGHT OF WAY WIDTH	ROAD	SURFACE CONDITION	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES	NDIS	ROAD MARKING	FURNITURE LIGHTING	OTHER	EXISTING	

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

Ver.1.1 Mar/98

1 20 21 22	Potential January Chart EOP PAVEMENT / BOAD	3/VA 603		Inspection Date:	3/3/'98			No. 4	
ביפוופת	Route Ouinta	Ouinta Avenida		Γ	Engineer	Engil	Engineer	Inspector	
General	Ë	km to	1.4 km			,			
formation	Jŏ		1	Lanes: 2	S.Imai	H.Takeda			eren
	Direction: Con	R	to D.Rodorigu(Design Speed:	ed: 40km/h			-		50 9-3 0
	inspectors:		Constructed Year:						* '2'.
	Damage type	6 (1)Settlem	6 (1)Settlement (2)Cracking (3)Pothole (4)Wave (5)Rutting (6)Ravellin Cracking Ratio	ive (5)Rutting (6)Ravellin	Cracking Ratio		45 %	%	
	Pavement	1 (1) Aspha	1 (1)Asphalt (2)Surface treated (3)Gravel (4)Earth	(4)Earth	Ruting Depth	=0	ę.	10 mm	1
Inspection	Terrain	5 (1)Mount	5 (1)Mount (2)Hill (3)Flat (4)Swampy (5)Town	own	Long Rough	αï	8	3 mm	-
	Soil	6 (1) Rock	6 (1) Rock (2) Gravel (3) Sand (4) Silt (5) Cla	Other(Potholes Nos.		Depth Ave.	шш	
Items	Drainage pipe	Diameter =	r = mm Concrete, Steel, Othe	el, Othe(Diameter			mm	1
	Ground Water	4 (1) Flow (5	Seepage		Ave			mm	raz-para
-	and leased	right	industry		General Remark		tair		
	Fuvironment	left	industry			remark	Grade		*****
					Judgement		¥	Reconstruction	130.
	Suprey Point	1.0 Km		•	(Incl.subgrade)	0	п	Overlay	
	· · · · · · · · · · · · · · · · · · ·	+	200 m to	400 m			TI	Surface Treatment	100
							Ŋ	no Repair needed	
						Photograph	ηc		Pa Belonda
	F (earth)	0	ú	F (earth)					-
,	3.0m		9.10m	3.0m					. is whi
				1					D-1-22
Cross									distant.
Section									de Srice
									· ANDRONE
									e †3 secka
****									erio Cariglia
									+orizonai
_									
									· · · · · · · · · · · · · · · · · · ·
`	A: Platform width	ı width	F: Foot path width	÷					Party III
	B; Carraige	Carraigeway width	G: Crossfall						-
	 o	Traffic lane width	H: Median width						AND SOLVE
		r width							1
				Ţ-					

Site Photograph (1/3)Road Name: Quinta Avenida H. Takeda Photograph taken by: 3/3'98 Date: Station Station 1200 Station Station 1400 200 Station Station 1600 400 Station Station 1800 600 Station Station 2000 800 Station Station 1000 2200

Site Photograph

Road Name: Quinta Avenida (2/3)

Photograph taken by: 3/3'98 H. Takeda Date: Station Station 2400 3600 Station Station 3800 2600 Station Station 4000 2800 Station 4200 Station 3000 Station Station 4400 3200 Station Station 4600 3400

Site Ph Road Na	otogra ime:	ph Quinta Avenida	,	(3/3)
Date:	3/3'98	Photograph	taken by: I	H. Takeda
Station 4800			Station	
Station 500 0			Station	
Station 5100			Station	
Station			Station	
Station			Station	
Station			Station	

3. Avenida Conduta

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

1-1	ending	point	1300	Quinta Avenida	Quinta Avenida							about 27m	Ш	മ		ш.	ou	υo	οu	high V line	low V line	oc C	ou Ou	ou	ou	house	house
SHEET No.			1200	ou	no							about 27m	ш	മ		UL.	ou	no	ou	high V line	low V line	no	ou	υo	ou	house	house
			1000	no	no							27.5m	Ħ	ω		L	no	ditch on earth	OU	high V line	low V line	no	no	no	ou	house	house
H.Takeda			800	OU	ou							about 27m	ш	В		ш	οu	ditch on earth	no	high V line	low V line	OU	no	OU	OU	house	house
INSPECTOR H.Takeda			009	ou	ou							about 27m	E	L .		F	ou	ditch on earth	ou	high V line	low V line	no	no	ou	ou	house	house
_			400	local	local							about 27m	Ξ	1L		L	ou	ditch on earth	ou	high V line	low V line	no	ou	ou	ou	house	psnou
ATA SHEET S,Imai			200	ou	local	-					water	about 27m	ш	മ		L	ou	٥u	ou	high V line	low V line	ou	ou	ou	οu	house	house
ROAD INVENTORY INVESTIGATION DATA SHEET 3/3/'98 INSPECTOR S.Imai	starting	poin	0	G.Monterio	Liberio	squater						ş	ш	ıL		ц.	ou	ou	Ψ	high V line	low V line	ou	ou	ou	ou	house	house
ORY INVES		•		LEFT	RIGHT	s/w	SHLD	ωC	CW	SHLD	ws	MIDIA	TYPE	CONDITION	 -		LEFT	RIGHT	RE	LEFT	RIGHT	2	MARKING	LIGHTING	ter.	LEFT	RIGHT
INVENT 3/3/'98	ME	uta	DISTANCE	l _o			LEFT			RIGHT		WAY V		ပ်	SIBILIT	OFILE			rRUCTU			SIGN	MA		OTHER		
ROAD		Avenida Conduta		INTERSECTING	ROAD		-	CROSS	SECTION		, -	RIGHT OF WAY WIDTH	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

Site Photograph (1/1) Avenida Conduta Road Name: Photograph taken by: 3/3/98 Date: Station Station 1200 Station Station 1300 200 Station Station 400 Station Station 600 Station Station 800 Station Station 1000

4. Rua Sanatorio - Bairro Popular

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

1000 service line squater 9.85m house house ĭ 6 ၉ 2 6 ô ᅌ 2 6 8 ш u, ω 800 service line SHEET No. squater 10.0m house house ç 6 0 ê 5 00 6 00 è 6 Ш m mount of garbage service line service line no passage about 12m squater house house 2 6 င္ပ 2 2 6 9 2 0 2 ш $\mathbf{\omega}$ u. 909 squater house 12.7m house ditch INSPECTOR H.Takeda 2 ဥ ၉ 9 2 9 2 6 2 $\mathbf{\omega}$ ш 400 service line squater house house 9.9m ditch 6 2 2 5 2 6 2 9 ဥ ш œ LL, 300 small river crossing 200 service line ROAD INVENTORY INVESTIGATION DATA SHEET house 17.4m house local 2 9 ê င္ပ 9 2 9 2 6 മ INSPECTOR S.Imai service line Saldanha Machado squater house house 18.0m starting Ξ ç ê ဇို 6 0 0 ш $\boldsymbol{\omega}$ L point SHLD SHLD TYPE RIGHT RIGHT RIGHT LEFT RIGHT Š ζĶ LEFT SW LEFT LEFT Sys CONDITION RIGHT OF WAY WIDTH LIGHTING MARKING Sanatorio Bairro-Popular DRAINAGE STRUCTURE DISTANCE OTHER ROAD ACCESSIBILITY SIGN RIGHT 4/3/'98 **EXISTING PROFILE** LEFT ROAD NAME INTERSECTING FURNITURE SURFACE LAND USE DRAINGE UTILITIES EXISTING EXISTING CROSS SECTION SYSTEM ROAD ROAD ROAD

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

2			2600	ou	õ			ш	ditch			25.0m	ш	ന		u.	oc C	ditch on E	MH	90	service line	no	no	ou	ou	house	house
SHEET No.			2400	on	no			ш	ditch			26.6m	ш	മ		u.	no	ditch on E	00	ou Ou	service line se	ou	00	ou Ou	OL OL	house	church
			2200	ou	no			ш	ditch			18.5m	ш	œ		Ľ.	ou	ditch on E	OU	no	service line	оu	υo	no	ou	house	house
1. Takeda			2000	00	OL	-		ш	ditch			20.2m	E	В		L.	no	ditch on E	MH	no	service line	00	no	00	ou	house	house
INSPECTOR H.Takeda			1800	OU	no			m	ditch			14.7m	ш	В		£.	ou	ditch on E	ou	no	service line	ou	no	no	OU	house	house
			1600	ou	ou	garbage					2.9m	19.9m	Ш	В		L	ou	ОU	ou	ou	service line	ou	ou	no	no	house	house
ATA SHEET S.Imai			1400	ou	no	squater	garbage				garbage	13.8m	ш	8		ir.	οu	٥Ľ	MH	no	service line	ou	ou	no	no	house	house
ROAD INVENTORY INVESTIGATION DATA SHEET 4/3/'98 INSPECTOR S.Imai			1200	local	ou	squater	garbage					11.8m	ш	മ		L	OU	00	MH	ου	service line	ou	ou	ou	ou	house	house
RY INVES		ular	핑	LEFT	RIGHT	· M/S	SHLD	C/W	S	SHLD	s/w	DTH	TYPE	CONDITION	>		LEFT	RIGHT	IRE	LEFT	RIGHT		KING	TING	K	LEFT	RIGHT
INVENTC 4/3/'98	ME	irro-Pop	DISTANCE	NG			LEFT			RIGHT		WAY WI			SSIBILIT	PELE			STRUCTL			SIGN	MARKING	LIGHTING	OTHER		
ROAD I	ROAD NAME	Sanatorio Bairro-Popular		INTERSECTING	ROAD			CROSS	SECTION			RIGHT OF WAY WIDTH	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

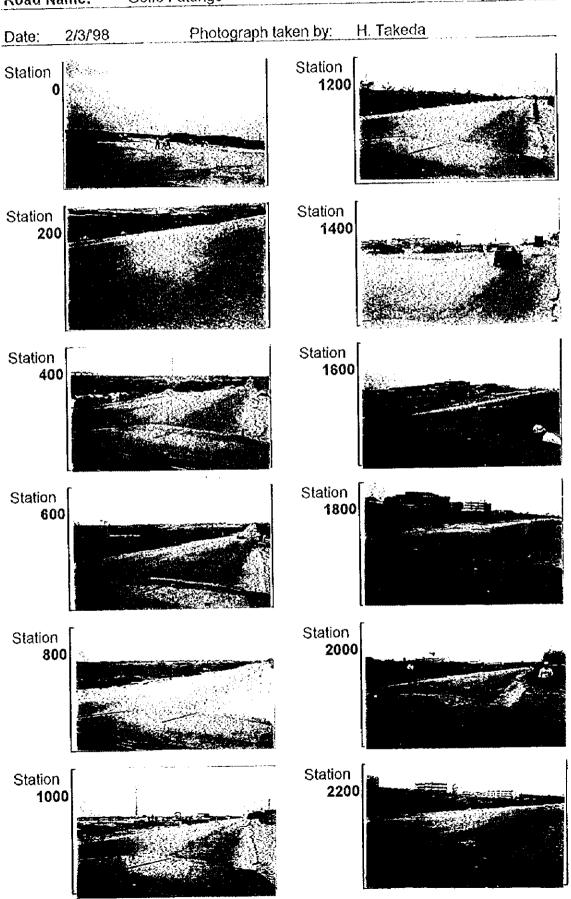
ROAD NAME Sanatorio Bairro-Popular	INSPECTOR S.IMAI	INSPECTOR H. Lakeda	,
orio Bairro-Popular	ending		
	point		
DISTANCE	2800		
INTERSECTING LEFT			
ROAD			
M/S			
LEFT SHLD			
CROSS			
SECTION			
RIGHT SHLD			
S/W			
RIGHT OF WAY WIDTH	πk		
ROAD TYPE	u		
SURFACE CONDITION	m		
ESSI			
EXISTING PROFILE	· L		
DRAINGE	ou		
SYSTEM	ou .		
DRAINAGE STRUCTURE	ou		
EXISTING LEFT	υo		
UTILITIES	service line		
SIGN	ou		
ROAD MARKING	no		
끭	no		
OTHER	no		
EXISTING LEFT	market		
LAND USE RIGHT	Ľ		

Site Pho Road Na	o tograph me: Sanatori	o Bairro-Popular	(2/2)
<u> </u>	4/3/'98	Photograph taken by:	H. Takeda
Station 2200		Station	
Station 2400		Station	
Station 2600		Station	
Station 2800		Station	
Station		Station	
Station		Station	

Site Photograph (1/2)Road Name: Sanatorio Bairro-Popular Photograph taken by: H. Takeda 4/3/98 Date: Station 1000 Station Station 200 Station 1200 Station 1400 Station 400 Station **600** Station 1600 Station Station 1800 770 Station Station 800 2000

Site Photograph

Road Name: Golfe Futungo (1/3)

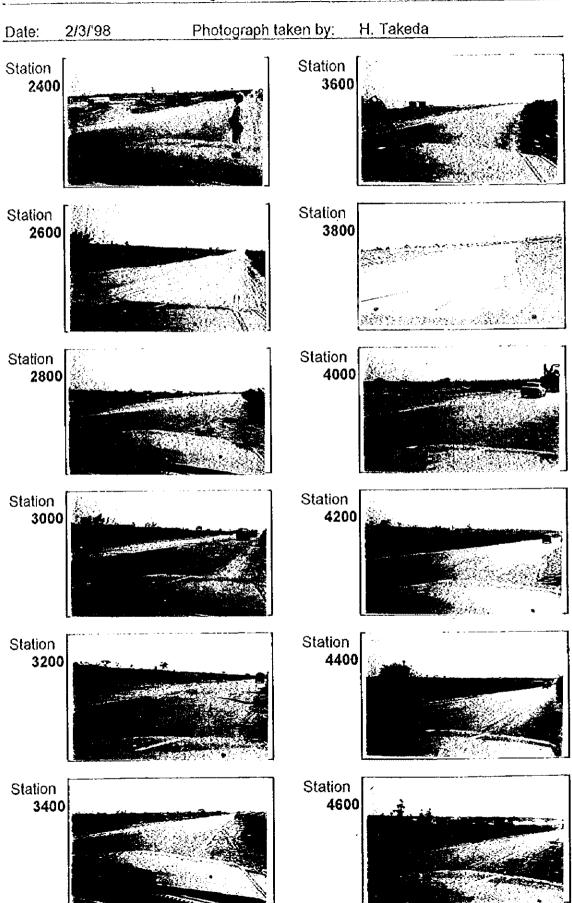


Site Photograph

Road Name:

Golfe Futungo

(2/3)



5. Estrada Golfe - Futungo

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

Takeda SHEET No. 1	on bridge		790 800 1000 1200	סט טט	on on	E (1.5m) E (1.5m) E (1.5m)		9,25m 9,30m 9,45m 9,35m			E(1.5m) $E(1.5m)$ $E(1.5m)$	about 12.5m about 12.5m about 12.5m	A A A A	я В		slope slope F	on on on	on on on	no no no	med. V line med. V line med. V line med. V line	on on on	no no no	on on on	on on on	on on on	field field field field	
INSPECTOR H. Takeda			400 600	ou	or	E (_	9.50m) E (1.5m)	bout 12.5m about 12.5m about 12.5m	4	it.		slope	ou	no	00	ne med. V line	ou	ou	no	no	no	field	
ET			200	٥ د	ou 0	Ε(9.35m		,) E (1.5m)	5m about 12.	4	щ		íL.	ou	ou	ou	ne med. V line	οu	กด	ou	ou	OU	field	
J DATA SHE DR S.Imai			0	ou	ou.	E (1.5m)		9.25m			E (1.5m)	5m about 12.	4	L		Ŀ	ou	ou	οu	e med. V line	οű	ou	ou	ou	ou	field	1
ESTIGATION INSPECTOR	starting	point					_	8.4m				about 12.5m a	1	m		L.	or	2	ou	med. V line	\vdash		2	ဥ	ou	field	
ROAD INVENTORY INVESTIGATION DATA SHEET 2/3/'98 INSPECTOR S.Imai			DISTANCE	LEFT	RIGHT	S/W	<u> "</u>	CVM	CM	HT SHLD	SW	Y WIDTH	TYPE	CONDITION	31LITY	LE	LEFT	RIGHT	ICTURE	LEFT	RIGHT	SIGN	MARKING	LIGHTING	OTHER	LEFT	1
ROAD INVE	ROAD NAME	Golfe Futungo	LSIG	INTERSECTING	ROAD		LEFT	CROSS	SECTION	RIGHT	-	RIGHT OF WAY WIDTH	ROAD	H	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES	S	ROAD	FURNITURE LI	10	EXISTING	(

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

2			2800	õ	5 C	F (1.5m)			9.35m	,		E (1.5m)	about 12.5m about 12.5m	4	മ		1	1.	00	ပို	ou	med. V line	υo	no	000	oc Oc	ου	field	field
SHEET No.			2600	00	οu	E (4 5m)	(11711)		9.30m			E (1.5m)	about 12.5m	۵	m			slope	2	no	ou	med. V line	ou	900	ou	Ou	ou	field	house
H.Takeda	on culvert	unpaved	2400	ou	00				, 11.30m					ш	œ			siope	Oct	ou	ou	med. V line	ou	ou	ou	ou	ou	apartment	ponse
INSPECTOR H.Takeda			2200	C			E (1.5m)		9.90m			E (1.5m)	about 12.5m	4	α	3		u.	no	ou	ou	med. V line	no	ou	ou	ou	OL.	apartment	house
(2000	peca sacour	access toad	011	E (1.5m)		9.30m			E (1.5m)	about 12.5m	4	u	L		L	no	no	ou	med. V line	no	OL	٥u	ou	ou.	apartment	house
S.Imai			1800			ou	E (1.5m)		9.10m			E (1.5m)	about 12.5m about 12.5m about 12.5m	٩	0	٥		L	no	ou	or Or	med. V line	no	no	ou	ou	o'L	anantment	house
SHEET			4600		00	2	E (1.5m)	·-	9.30m			E (1.5m)	about 12.5m	۵	() (T.		ட	no	ou	ou Ou	med. V line	20	2	ou	Qu.	0	*odrem	house
ROAD INVENTORY INVESTIGATION DATA			1400	2	ou.	local road	E (1.5m)		9.35m			F (1.5m)	about 12.5m			4		ī.	ou	o <u>c</u>	02	med. V line	or Or	oL.	CC	9		\$10.5¢	house
ORY INVES		1	ווייייייייייייייייייייייייייייייייייייי	- 1	LEF	RIGHT	S/W	SHLD	ζ	Š	SHLD	N/S	HLOV	7007	3	CONDITION			LEFT	RIGHT	URE	LEFT	RIGHT	ľ	MARKING	IGHTING	OTHER	- CET	RIGHT
INVENT	ME	֓֞֞֞֜֜֞֜֞֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֓֓֓֡֓֡֓֡֓֡	10 14 0 FOI C		NG NG			LEFT			RIGHT		WAY W			် ပ	SSIBILI	ROFILE			STRUCT			SIGN	NA N				
ROAD	2	ייייייין אייי	ofilman allog		INTERSECTING	ROAD			CROSS	SECTION			DIGHT OF WAY WIDTH		OKOK OKOK	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		2000	FIRMITIBE		CINE	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

m			4400	ou	00	E (1.5m)		9.40m			E (1.5m)	about 12.5m	٧	L		ц,	no	V ditch	no	med. V line	no	no	ou	no	ou	field	field
SHEET No.			4200	00	no	E (1.5m)		9.30m			E (1.5m)	about 12,5m about 12.5m about 12.5m about 12.5m about 12.5m about 12.5m about 12.5m	A	L		ц.	no	V ditch	no	med. V line	no	ou	ou	00	ou	field	field
			4000	00	OU	E (1.5m)		9.30m			E (1.5m)	about 12.5m	4	L.		slope	٥u	no	00	med. V line	ou	ou	no	S.	no	field	field
H.Takeda			3800	no	no	E (1.5m)		9.40m			E (1.5m)	about 12.5m	4	L		slope	OL OL	no	ou	med. V line	ou	ou	ou	no	ou	garbage depot	garbage depot
INSPECTOR H.Takeda			3600	OU	ου	E (1.5m)		9.65m		,	E (1.5m)	about 12.5m	4	L		L	or Or	٥٥	00	med. V line	ou	ομ	OU	ou	ou	garbage depot garbage depot	field
			3400	ou	00	E (1.5m)		9.15m		,	E (1.5m)	about 12.5m	4	ı		ц	oc	20	92	med. V line	οu	o _L	ou	ou	00	field	
ATA SHEET S.Imai			3200	OU	ou Ou	E (1.5m)		9.30m			E (1.5m)	about 12.5m	٩	. ac		slone	02	92	92	med. V line	or Or	o _c	ou	ou	оu	field	field
STIGATION D			3000	oc	or	ou		9.20m			E (1.5m)	about 12.5m	4	α		enols	000	or Or	ou	med. V line	OL OL	ou	o <u>C</u>	or.	o C	field	field
ORY INVES			끙	LEFT	RIGHT	s/w	SHLD	χ O	C/W	SHLD	S/W	DTH	TYPE	NOITIONOS	ے		1 EFT	RGH	JRE	LEFT	RIGHT	1	MARKING	LIGHTING	8	LEFT	RIGHT
ROAD INVENTORY INVESTIGATION DATA SHEET DATE 2/3/'98 INSPECTOR S.Imai	ROAD NAME	Golfe Futungo	DISTANCE	INTERSECTING	ROAD		LEFT	CROSS	SECTION	RIGHT		RIGHT OF WAY WIDTH	ROAD	Ų	V	EXICTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES	SIGN	ROAD	Ä		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

ROAD INV	NVENTO 2/3/98	RY INVE	ROAD INVENTORY INVESTIGATION DATA S E 2/3/'98 INSPECTOR S.Imai	ATA SHEET S.Imai		INSPECTOR H. Takeda	H.Takeda		SHEET No.	4
ROAD NAME				on culvert	Project Nova Vida	Vida				unpaved
Golfe Futungo	:			unpaved						section
Ď	DISTANCE	iii.	4600		4800	5000	5200	5400	5600	5650
INTERSECTING		LEFT	OL OL		access road	no	ou	00	OU	no
ROAD		RIGHT	no		ou	no	ou	ou	ou	00
		S/W	E (1.5m)		E (1.5m)	E (1.5m)	E (1.5m)	E (1.5m)	E (1.5m)	E (1.5m)
<u> </u>	LEFT	SHLD		Į)		_			
CROSS		CW	8.50m	11.2m	9.30m	8.70m	9.75m	√ 10.60m	} 9.15m	
SECTION		χ								
ž	RIGHT	SHLD					,	,	`	
		S/W	0		E (1.5m)	E (1.5m)	E (1.5m)	0	0	0
RIGHT OF WAY WIDTH	AY WI	TH	about 12.5m		about 12.5m	about 12.5m	about 12.5m	about 12.5m	about 12.5m about 12.5m about 12.5m about 12.5m about 12.5m about 12.5m	about 12.5m
ROAD		TYPE	4	ш	٧	Ą	A	٨	4	ш
SURFACE	SON	CONDITION	۵	В	8	7	Ę.	L.	u	B
ROAD ACCESSIBILITY	IBILIT									
EXISTING PROFILE	H.E		slope	adols	slope	slope	Ц	slope	slope	u.
DRAINGE		LEFT	ou	ou	ou	ΩO	ou	ou	ou	00
SYSTEM	•	RIGHT	ou	no	no	V ditch	V ditch	00	00	V ditch
DRAINAGE STRUCTURE	CTU	RE	ဝင	ou	no	οu	ou	no	ou 0	no
EXISTING		LEFT	med. V fine	med. V line	med. V line	med. V line	med. V line	med. V line	med. V line	med. V line
UTILITIES		RIGHT	ou	οu	ou	ou	no	ou	no	000
	SIGN		ou	ou	ou	OU	no	ou	oc	°
ROAD	MARKING	ING	ou	ou	OU	no	ou	no	ou	ê
FURNITURE	LIGHTING	ING	OL.	no	ou	υo	ou	ou Ou	όυ	no
	OTHER	R	ou	no	no	no	ou	ou	ou	oc.
EXISTING		LEFT	field	field	field	field	field	field	field	field
LAND USE		RIGHT	field	field	field	field	field	field	field	field

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

SHEET No. 5																											
INSPECTOR H.Takeda	ending	point	6200	no	Ou	E (1.5m)		9.2m			E (1.5m)	about 12.5m	A	i.		slope	V ditch	V ditch	ou	med. V line	no	по	Ou	no	ou	house	house
	paved	_	6000	ou	no	E (1.5m)		} 9.2m			E (1.5m)	about 12.5m about 12.5m	Ą	Ŧ		slope	no	V ditch	00	med. V line	no	ou	ou	no	no	field	field
ATA SHEET S.Imaí			5850	υo	ou			7.17m					Ξ	В						med. V line		OU	no	ou	ou	field	field
ROAD INVENTORY INVESTIGATION DATA SHEET 2/3/98 INSPECTOR S.Imai			5800	ou	οu	ou					ou	about 12.5m	ш	۵		Ŀ	no	V ditch	ou	med. V line	ou	ou	no	ou	ou	field	field
ORY INVES		.	35	LEFT	RIGHT	N/S	SHLD	S C S	SO	SHLD	ws.	IDTH	TYPE	CONDITION			LEFT	RIGHT	URE	LEFT	RIGHT		MARKING	LIGHTING	ER	LEFT	RIGHT
INVENTO	IME	9	DISTANCE	ING			LEFT			RIGHT		RIGHT OF WAY WIDTH			ESSIBILI	ROFILE			STRUCT			SIGN	MAR	. .	OTHER		
ROAD DATE	ROAD NAME	Golfe Futungo		INTERSECTING	ROAD			CROSS	SECTION	<i>*</i>		RIGHT O	ROAD	SURFACE	ROAD ACCESSIBILITY	EXISTING PROFILE	DRAINGE	SYSTEM	DRAINAGE STRUCTURE	EXISTING	UTILITIES		ROAD	FURNITURE		EXISTING	LAND USE

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA

Ver.1.1 Mar/98

							١				000	
Detailed Ir	Detailed Inspection Sheet FOR	ļ Š	ł	PAVEMENT / ROAD		Inspection Date:		2/3/98				T
	Route: E Goffe-Futungo	Ę	12					Engineer	Engi	Engineer	Inspector	1
General	چ		km to	1.4 km	E				- - - - -			- 1814 .
tion	Rd. Class; Sec. Artl		ł	Nos. of C/W	1	1 Lanes:		2 S.Imai	н.Такеда			نقصنات
	Direction: Kianbaki	봈	 	to Futungo Design Speed:	esign Sp	eed:	70km/h					فستسوم
	Inspectors:			Constructed	d Year:						45.07	
	ě	3,6	(1)Settleme	nt (2)Cracking (3	Pothole (4)	Vave (5)Rutt	ting (6)Ravellir	3,6(1)Setttement (2)Cracking (3)Pothole (4)Wave (5)Rutting (6)Ravellin Cracking Katio			7.0	T
		٢	(1)Asphalt	1 (1) Asphalt (2) Surface treated (3) Gravel (4) Earth	ted (3) Grav	el (4)Earth		Ruting Depth	= O		U Gam	T
locacetion .	Terresio	67	(1)Mount (3 (1) Mount (2) Hill (3) Flat (4) Swampy (5) Town	Swampy (5)	Town		Long Rough	± D		3 mm	T
- Inchange III	Soil	9	(1) Rock (2	6 (1) Bock (2) Gravel (3) Sand	1 (4)Silt (5)((4)Silt (5)Clay (6)Other(er(Potholes Nos.		Depth Ave.	mæ	Ī
,	Designation)	Diameter #	, ww	mm Concrete, Steel, Othe	teel, Othe(Diameter			mm	
SILLA	Crail age pipe	4	(1) Flow (2)	Seepage	t (4)None			Ave			mm	Ī
	Stould water		(a)	house				General Remark		fair: damag	fair: damaged by catapillar	7
	Land Ose and		11.61.1 	field					remark	Grade		-
	CHAIL CHILICHIC]						Judgement		н	Reconstruction	
		*	3					(Incl.subgrade)	0	Ħ	Overlay	-
	Survey Fount	-	.	002	5	400	400 m			Ħ	Surface Treatment	
		•								Ν	Unnecessary to Repair	į.
									Photograph	hd,		
	יים נים נו		ď			E (earth)						
	(min) 1		a	9.35m		1.5m						es en en
	me.r											
						,						- Parkins I
Cross												 .
Section					. ,							-5 40.6
		_					; ; ; ; ;					
												والمراهية المنطقة
												نطبقة بست
	6. Diatform width	n win	ŧ	L.	Foot path width	/idth						-
	R: Carraideway width	eway	width		Crossfall							<u> کوست کی ب</u>
	ė	916	viđth		Median width	£						مسينين كم
	פווסתיהן אומדו	ž										

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF ROAD NETWORK IN LUANDA Site Photograph (3/3)Golfe Futungo Road Name: Photograph taken by: H. Takeda 2/3/98 Date: Station Station 6000 4800 Station Station 5000 6200 Station Station 5200 Station Station 5400 Station Station 5600 Station Station 5800

5-2 Soil Survey Result (CBR Test)

Soil Test Results and Existing Pavement Structure Observation Basic Study on the Project for Improvement of Road Network in Luanda

Inspector Observation Material ŝ į 1 A. Shikano Engineer Existing Pavement Structure Observation 1000 Thickness (mm) 1,000 ł ı Pavement Structure Lower Subbase Surface Course Sp Upper Subbase Base Course Engineer Subgrade Subg. (Direction Boav. to Jane) J.S.SILVA Sketch Particle Size (mm) - 0.001 1+900 km 10.01 10.01 8 <u>5</u> GRADING CURVE ဝ Passing Weight (%) Location 1-7 10% %09 %09 1.00m <u>--</u> 5.0% 2.61 를 ջ 호 Š ı ŧ Ru Senado da Camara CBR (California Bearing Ratio)% *Optimum moisture content(%) Natural Moisture Content% · Maximum dry density(%) Specific Gravity gf/m3 -Shrinkage Limit% Plasticity Index · Plastic Limit% ·Liquid Limit% Atterberg Limit Sampling Depth Filling Soil Route

Basic Study on the Project for Improvement of Road Network in Luanda

Soil Test Results and Existing Pavement Structure Observation

Natural Moisture Content% Atterberg Limit Liquid Limit% -Plastic Limit%	2.63 6.8% NP	809	CRADING CURVE Surfa Surfa Surfa Surfa Oscillation (Direction Kilua to Rodr.) J.S.SILVA Existing Pave Surfa Surfa Oscillation (Direction Kilua to Rodr.) J.S.SILVA Existing Surfa Surfa Surfa Oscillation (Direction Kilua to Rodr.) J.S.SILVA Surfa Subgr	Pavement Struc ment Structure ce Course Course Subbase ade	A. Shikano ture Observation Thickness Ms 6 As 6 As 6 As 694	A. Shikano servation mess Material Asphalt	Observation
-Shrinkage Limit% -Plasticity Index Filling Soil -Optimum moisture content(%) -Maximum dry density(%)	<u>a</u> <u>a</u> , ,	10% **	0.001 Passing Weight (%)	S.C. B.C. Subg	**************************************	6 300 694	

Basic Study on the Project for Improvement of Road Network in Luanda Soil Test Results and Existing Pavement Structure Observation

•			000	Engineer	Engi	Engineer	Inspector
Estrada da Conduta	ū	Location 3-3	(Direction Cond. to 5)	J.S.SILVA	A. Sh	A. Shikano	
	1.00m			Existing Pavement Structure	ture Observation	tion	
CBR (California Bearing Ratio)%	14%			Pavement Structure	Thickness	Material	Observation
Specific Gravity gf/m ³	2.65	GR.	GRADING CURVE	Surface Course	-	ŧ	
Natural Moisture Content%	%6'9			Base Course	•		
			10 10 10 10 10	Upper Subbase	-	1	
	20		uw) əzi	Lower Subbase	ļ	I	
	4-	(5)	2.0 Princle S	Subgrade	1000	CL-ML	
-Shrinkage Limit%	12		80	Sketch			
	9				-		
		Pas	Passing Weight (%)	Subg. CL-ML	1000		
•Optimum moisture content(%)	3						
• Maximum dry density(%)	i				•		

Basic Study on the Project for Improvement of Road Network in Luanda

	1		Soil Te	st Resi	Soil Test Results and Existing	Pavem	Existing Pavement Structure Observation	Observati	ion		r
<u>. </u>							Engineer	Engineer	leer.	Inspector	
	Route	Rua Sanatorio Bairro Polar	rro Polar	Location 4-5	n 1+900 km (B.P. to S)	J.S.5	J.S.SILVA	A. Shikano	kano		- Angelija part Total art
• • •	Sampling Depth	÷	1.00m				Existing Pavement Structure Observation **	ture Observa	tion *		
<u></u>	CBR (Californ	CBR (California Bearing Ratio)%	%6				Pavement Structure	Thickness (mm)	Material	Observation	<u> </u>
<u>-</u> -	Specific Gravity gf/m ³	ty gf/m³	2.68	U	GRADING CURVE		Surface Course	1	1		1277 P. 1777 F. 1884 C
	Natural Moisture Content%	ure Content%	18.6%				Base Course	ŀ	1		<u> </u>
	Atterberg Limit	it			10		Upper Subbase	***	I		(egyősna) műr kezendi.
	·Liquid Limit%	mit%	38		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Lower Subbase	-	ì		y or and defined
3-45	-Plastic Limit%	imit%	17), [8]	ricle Si		Subgrade	700	ъ		\$1.54 p. pr. 1205 - 4-2 .
_:-	·Shrinkage Limit%	e Limit%	15	<u>%</u>	0.0	σ)	Sketch	,			Kabadas (Ali alika Talika)
	-Plasticity Index	y Index	21			<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		1200			make, magness thereon
	Filling Soil			\	Passing Weight (%)	<u></u>	Subg	<u></u>			
	•Optimum m	•Optimum moisture content(%)	I				ರ 				(TATE MINER
	· Maximum dry density(%)	y density(%)	I					-•	8x6868@e	Total Control of the	

Basic Study on the Project for Improvement of Road Network in Luanda Soil Test Results and Existing Pavement Structure Observation

					Engineer	Engi	Engineer	Inspector
Route	Golf-Fudungo		Location 5-7	3+050 km (Direction Goffe to Funt)	J.S.SILVA	A. Sh	A. Shikano 😤	
Sampling Depth	th	1.00m			Existing Pavement Structure Observation	ture Obsorv	ation	
CBR (Califor	CBR (California Bearing Ratio)%	14%			Pavement Structure	Thickness (mm)	Material	Observation
Specific Gravity gf/m ³	ity gf/m³	2.65		Z S	Surface Courso	Ą	Asphalt	
Natural Moist	Natural Moisture Content%	6.7%			Base Course	250	Soil Cement	
Atterberg Limit	nit			10	Upper Subbase	450	į	
·Liquid Limit%	imit%	50			Lower Subbase	\$	1	
• Plastic Limit%	Limit%	81	\$60 \$40	29	Subgrade	294	CL	
-Shrinka	-Shrinkage Limit%	16	<u></u>	8	Sketch	,		
-Plasticity Index	y Index	2				6 250		
Filling Soil] &	Passing Weight (%)	U.S.	450		
-Օբենասա ո	Optimum moisture content(%)	l			Subg CL.	294		
• Maximum dry density(%)	ry density(%)	1				•		

