JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF EQUIPMENT AND TRANSPORTS
REPUBLIC OF NIGER

THE STUDY

ON

SANITATION IMPROVEMENT

FOR

THE NIAMEY CITY

IN

THE REPUBLIC OF NIGER

FINAL REPORT
VOLUME III : APPENDIX

DECEMBER 2001

TOKYO ENGINEERING CONSULTANTS CO., LTD.
YACHIYO ENGINEERING CO., LTD.

In this report, project costs are estimated based on May, 2001 prices with an exchange rate of

FCFA 100 = FRF 1.00 = JPY 16.66

THE STUDY

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SANITATION IMPROVEMENT

FOR

THE NIAMEY CITY

IN

THE REPUBLIC OF NIGER

FINAL REPORT

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MASTER PLAN

FEASABILITY STUDY

APPENDIX A: MINUTES OF MEETING

MINUTES OF MEETINGS

ON THE INCEPTION REPORT

FOR THE STUDY
ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY
IN THE REPUBLIC OF NIGER

AGREED UPON BETWEEN

THE MINISTRY OF EQUIPMENT AND TRANSPORTS,
THE URBAN COMMUNITY OF NIAMEY, AND
THE MINISTRY OF FOREIGN AFFAIRS, COOPERATION, AND AFRICAN INTEGRATION;

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY STUDY TEAM
NIAMEY, JULY 28, 2000

Mr. Mahamadou HALIDOU
Secretary General,
The Ministry of Equipment
and Transports

Mr. Naoru SUZUKI
Team Leader
JICA Study Team
The Japan International
Cooperation Agency

Mr.Amadou Bana
Deputy Secretary General,
The Urban Community of Niamey

Ms. Absi Fatoumata
For the Secretary General,
The Ministry of Foreign
Affairs, Cooperation, and
African Integration;
Interim Director,
American Asian and Oceania

In accordance with the Scope of Work agreed between the Republic of Niger (hereinafter refereed to as "the Government of Niger"(GON)) and Japan International Cooperation Agency (JICA) on March 6th, 2000, the Study Team submitted the Inception Report (IC/R) for the Study on Sanitation Improvement for the Niamey City in the Republic of Niger (10 copies in English and 20 copies in French) and had a series of discussions on it from July 26 to 28, 2000.

The participants in the meetings are listed in the Attachment. The IC/R was accepted in principle by the Niger side with the following understanding:

1. The Niger side and the Study Team fully agreed on the contents of the IC/R, with further explanation by the Study Team on the following issues:

   a) The Study Team explained to the Niger side the process and method of the Master Plan and Feasibility Study and assured that the both sides have the same understanding in terms of the purpose and basic idea of the Study on Sanitation Improvement for the Niamey City.

   b) Both sides agreed to set the target year of the Master Plan at the year 2015.

2. The Counterpart Personnel

   The Niger side confirmed to appoint counterpart personnel to the Study team. The counterpart personnel will consist of the officials relevant to the significant expertise sectors of the Study.

3. The Steering Committee

   The Niger side organized the Steering Committee to help realize the efficacious and efficient implementation of the Study. The Committee is chaired by the Secretary General of Ministry of Equipment and Transports, and its members are the executives of the following ministries and agencies:

   a. Ministry of Equipment and Transports (MET),
   b. The Urban Community of Niamey (UCN),
   c. Ministry of Foreign Affairs, Cooperation and African Integration (MFA/C/AI),
   d. Ministry of Planning (MP),
   e. Ministry of Public Health (MPH),
   f. Ministry of Environment (ME), and
   g. Ministry of Water Resources (MWR)

   If necessity arises, other ministries and agencies may be called.

4. Regarding the formulation of Pilot Project, the JICA Study Team explained the expected outlines and components of the Pilot Project. The Pilot Project will consist of 2 experimental plants. The Niger side will take necessary actions as per requests by the Team to carry out the smooth site reconnaissance and surveys. After the site survey, the Study Team will proceed to a contract agreement with the local constructor for the construction of the 2 experimental plants.

5. The Niger side informed to the Study Team and confirmed that the present JICA Study is the only foreign cooperation proposed for the formulation of Master Plan for sanitation improvement of the Niamey City, and no other cooperation from other donors has been requested for the same study.

6. The Study Team shall carry out the following survey items on the basis of subcontracts with the local engineering consultants in Niamey:
   1) Topographic Survey
   2) Borehole Test at the 5 Proposed Sites
   3) Public Perception Survey
   4) Water Quality Analysis
   5) Survey on the Amount and Composition of Solid Waste

7. Office Space Provided for the Study Team
   The Niger side provided the Study Team with sufficient office space for about 20 staff (the team members and counterpart personnel) to work in, and such equipment as tables, chairs, and air conditioner(s). The Study Team confirmed that the office space and the furniture provided were so arranged to satisfy the need for the Study.

8. Seminars for the Technology Transfer
   Both the Niger and Japan sides recognized the importance of the seminar on the relevant issues to the Study so that the satisfactory technology transfer could be pursued. The topics, modes, and scale of the seminars will be discussed and concluded by the both sides during the course of the Study.

Attachment

LIST OF ATTENDANTS

Niger side

Ministry of Equipment and Transports

M. Mahamadou HALIDOU	Secrétaire Général
M. Daouda RABIOU	Directeur Général de l'Urbanisme de l'Habitation et de la construction
M.Hamidou ABOUBACAR	Directeur de l'Urbanisme et de l'Habitat
M. Ousseini HAMZA	Chef du Service Central de l'Assainissement et des Infrastructures Urbaines

The Urban Community of Niamey

M. Amadou SALIFOU	Préfet – Président/ CUN
M. Ali YAHAYA	Administrateur Délégué Commune I
M. Amadou KARIMOU	Administrateur Délégué Commune II
Mme MAI CHETIMA	Administrateur Délégué Commune III
M. Bana AMADOU	SGA
M. Idi MAMANE	Conseiller Economique
M. Gonini OUSSEINI	Directeur des services Techniques
M. Seydou KAYABA	Chef Service Assainissement
M. Koko BOUREIMA	DEP
Mme IBRAHIM BINTA	DAP
M. Amadou SOULEY	Chef Affaires Domaniales
M. Amadou BOUKARI	Service Voirie Commune III
M. Harouna BELLO	Service Hygiène et Assainissement
M. Assoumane OUMAROU	Service Assainissement
M. Garba M. HAMIDOU	Chef Service Voirie
M. Namake SOULEY	Chef Service Hygiène et Assainissement

Ministry of Plan

M. Oumarou ELHADJI	Secrétaire Général
M. Akreba GHABDOU	Chef Division Assainissement

Ministry of Environment

M. Attaou Mahaman LAMINOU	Directeur de l' Environnement
M. Malam Saidou SANOUSSI	Direction de l'Enviromement
M. Mohan Saidou SANOUSSI	Chargé de Programme (SLPN)

M. Idi ABARCHI	Bureau d'Evaluation Environnementale et des Etudes d'Impacts

Ministry of Public Health

M. Assoumane ADAMOU	Ministre
M. Abdramane SALIFOU	Directeur des Etudes et de la Programmation (DEP)
M. Ibrahim Issa BAARE	Directeur de l'Hygiène Publique et de l'Education pour la Santé DHP/EPS

Ministry of Water Resources

M. Elhadji Akoli DAOUEL	Ministre
M. Souleymane ATAWATEN	Chef Service Hydraulique Urbaine

Ministry of Foreign Affairs, Cooperation, and African Integration

Ms. Absi FATOUMTA	Chef de Division Amérique
Mr. Inoussa MOUSTAPHA	Japan and Southeast Asian Desk Officer

Japanese side

Mr. Kaoru SUZUKI	Team Leader / Urban Sanitation
Mr. Masaru OGAWA	Sewerage / Drainage Planning
Mr. Jean-Jacques COUSTALINE	Pilot Sewage Treatment
Mr. Hiroshi ABE	Solid Waste Composition Analysis / Solid Waste Management (2)
Mr. Hiromasa MINAKAMI	Institution / Economic & Financial Analysis
Mr. Atsushi ITO	Interpreter / Translator
Mr. Koichi YAMASHITA	Team Administrator

Advisory Committee

Mr. Mikio TANI	Member of Advisory Committee

JICA / JOCV

Mr. Yoshio HORIUCHI	Resident Representative

MINUTES OF MEETINGS

ON PILOT PROJECT

FOR THE STUDY

ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY

IN THE REPUBLIC OF NIGER

AGREED UPON BETWEEN

THE MINISTRY OF EQUIPEMENT AND TRANSPORTS, MINISTRY OF EDUCATION, THE URBAN COMMUNITY OF NIAMEY

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY STUDY TEAM

NIAMEY, 18 SEPTEMBER 2000

Mr. Daouada KABIOU
Director General,
Ministry of Equipment
and Transports (MET).

Mr. Kaoru SUZUKI
Team Leader,
JICA Study Team

Mr. Hassane SOUMANA
Inspector, (DGI)
Ministry of Education (MOE).

Ms. Hama Ramatou
Schoolmistress,
Bandabari Primary School II.

Witness by

Mr. Yoshio HORIUCHI
Resident Representative,
JOCV/JICA Niger Office

In accordance with the Inception Report (I/R) presented and discussed with the Ministry of Equipment and Transports (MET) and JICA Study Team on 28th Juliet 2000, the Study Team has requested the MET to chair the Coordination Meeting with the Ministry of Education (MOE) concerning the "Under taking of the Nigerien side" for the Pilot Project. The Pilot Project consists of UASB pilot plant + Eco-system Ponds, and toilet + JYOKASO + eco-system ponds + soak pit.

The participants in the meeting are listed in the attachment. All the participants have accepted the following understandings.

1. The Study Team explained contents of "Undertaking of the Nigerien Side for the pilot Project" in detail as per Team's letter, Ref. N°. JT-0908 dated 08 September 2000. After discussion and explanation, both party eventually agreed that Nigerien Side fully understood to take the "Undertaking of the Nigerien Side".
    1) Procedure for the "Droits Fonciers Coutumiers"——Action to be taken by Urban Community of Niamey (UCN).
    UCN is requested to take necessary action to confirm the land owner of the proposed UASB site. After confirmation of the right land owner, UCN shall have the coordination meeting with land owner and top man of the "quartier" to finalize the compensation and/or alternative land.
    2) Power supply and water supply —— Action to be taken by MET.
    MET shall also start necessary procedure with the concerned authorities to connect water and power supply to the proposed sites. (New electric and water supply connection from NIGELEC and SNE, respectively)
    3) Exterior —— Action shall be taken by the MET/UCN.
    MET shall also prepare the sufficient budget to install the gate wall/fence around the proposed UASB plant site in order to protect the Plant. Simultaneously, UCN shall take the action for the installation of gate and wall/fence around proposed Jyokaso plant in the school.
    4) Payment to NIGELEC and SNE—— Action to be taken by the MET and MOE.
    MET and MOE shall make necessary permanent arrangement to pay electricity and water bill to NIGELEC and SNE, respectively.
    5) Sustainable O&M
    MET and UCN shall do permanent arrangement for daily O&M of the plants.

2. Hygiene Education

The Team explained the strategy of the Hygiene Education, which contents are as follows:

- JICA Study Team is going to prepare an action plan for hygiene education of Niamey
- The Study Team have requested to have more communication between Ministry of Education and Study Team
- The Ministry of Education agreed to present information and data related to hygiene education and to have enhanced communications.
- JICA study team plans to implement a hygiene campaign program at elementary school and for surrounding population selected as construction sites of Jyokaso and UASB wastewater treatment facility respectively.
- Ministry of Education and Head of Education committee of UCN agreed to implement hygiene program by JICA having positive cooperation of them (Ministry of education and Head of Education committee of UCN).

UCN has also intention to carry out this kind of Education to the School children with Japanese teachers at Bandabari Primary School II.

3. The Team also explained the purpose of the construction of two Pilot Plants. After construction of the Plants, the Team shall carry out the monitoring & evaluation for both the Plants so as to realize whether these plants based on different treatment processes can be suitable for this country or not. MET, MOE and UCN understood the Team's strategy of the Pilot Project.

4. Nigerien side asked to the Team about O&M costs especially of the power supply cost. According to the Team's calculation, the monthly electricity cost will be around CFA 50,000 for the "JYOKASO" Plant and CFA 100,000 for the UASB plant.

5. The Team announced and informed to the Nigerien side that topographic and soil investigation survey will be commenced by the end of September, 2000 at the both proposed pilot plant sites. The Team also requested for the warm co-operation from the Nigerien site so as to be able to carry out the smooth survey for the sub-contractors at the each of the proposed site.

Attachment

LIST OF ATTENDANTS

MET	
Mr. Daouda RABIOU	Director General, MET
Mr. Mahamadou Combari BONIFACE	Director, MET
Mr. Hamza OUSSEINI	Manager, ASS, IU/MET
Mr. Mahamadou CISSE	Manager, MET
MOE	
Mr. Hassane SOUMANA	Inspector, MOE
UCN	
Ms. Hama Ramatou	Schoolmistress, Bandabari School II
Mr. Ibrahim BANDADO	Inspector, Education Committee, UCN
Mr. Abdou ADAM	Manager, State of Affairs, UCN
Mr. Harouna	Manager, State of Affairs, UCN
Mr. Koko BOUREIMA	Director of Planning & Study, UCN
JOCV/JICA	
Mr. Yoshio HORIUCHI	Resident Representative, JOCV/JICA
JICA Study Team	
Mr. Kaoru SUZUKI	Team Leader, JICA Study Team
Mr. Jean Jacques COUSTALINE	Team Member, JICA Study Team
Mr. Kenji IGARASHI	Team Member, JICA Study Team
Mr. Hiroyuki AKASO	Team Member, JICA Study Team
Mr. Atsushi ITO	Team Member, JICA Study Team

MINUTES OF MEETING

ON THE PROGRESS REPORT

FOR THE STUDY

ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY

IN THE REPUBLIC OF NIGER

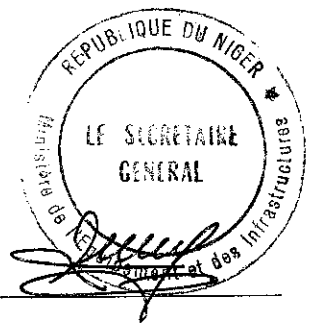
AGREED UPON BETWEEN

THE MINISTRY OF EQUIPMENT AND TRANSPORTS

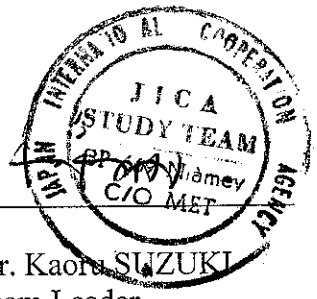
AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY STUDY TEAM

NIAMEY, NOVEMBER 1, 2000



Mr. Mahamadou HALIDOU
Secretary General,
Ministry of Equipment
and Transports



Mr. Kaoru SUZUKI
Team Leader,
JICA Study Team,
The Japan International
Cooperation Agency

In accordance with the Scope of work agreed between the Republic of Niger (hereinafter refereed to as "the Government of Niger" (GON) and Japan International Cooperation Agency (JICA) on March 6th, 2000 the Study Team submitted the Progress Report (PR/R) for the Study on Sanitation Improvement for the Niamey City in the Republic of Niger (10 copies in English and 20 copies in French) and had an official discussion on October 27, 2000.

The participants in the meeting are listed in the Attachment. The PR/R was accepted in principle by the Niger side with the following mutual understanding:

1. The Steering Committee Member
MET invited Ministry of Education (MEN) as a member of Steering Committee for this Project based on the Item N° 3 of M/M of IC/R. The Representation of JICA in Niamey wish that Mr. SUGIYAMA Yoshinobu Expert APD from JICA NIGER would be a member of a S/C of the Project. He would be attended to all meetings of this Committee.

2. The Counterpart Personnel
As per Minutes of Meeting (M/M) of Inception Report dated July 28, 2000, MET and CUN have nominated three full counterparts personnel to the Project Office of JICA Study Team, c/o MET, Plateau I.

3. The Niger side and Study Team fully agreed on the contents of the PR/R, with further explanation by the Study Team. The Study Team explained to the S/C of the Niger Side the Progress of this Project after submitting the IC/R till now.
   a) The Team reported the outcome of assessment works from the Study Area, and explained the present conditions of Sanitation facilities
   b) The Team also presented the Identification of crucial issues, topics and/or subjects with evidence for each field. Niger side agreed and observed the current situation on the issues.
   c) The Team finally explained the out line of essential featness of the Master Plan (M/P) to the S/C members towards Interim Report (IT/R). Moreover, the Team presented the possible Urgent Rehabilitation Works (URW) to be proceeded to the Feasibility Study (F/S)
   d) Simultaneously, the Team presented the present situation of "Pilot Study Facility Construction" since JICA/HQ approved this Study on October 20, 2000. The Team together with Sub-contractor commenced the detail design of two Pilot Plants. The construction will be started in the beginning of December 2000.

4. Solid Waste Management
   Considering the disastrous situation on solid waste management S/C of the Niger side understood the urgency to undertake actions, as presented in the PR/R.
   These are related to:
   a) Technical and institutional organization of waste pre-collection
   b) Assess the potential of sand recycling
   c) Rigorous control of waste transport
   d) Controlled land filling of solid waste

The Ministry of Equipment and Transport has underlined that the plastic waste , blocks the grate for the drainage of Stream water which worsens the situation of the drainage of water.

5. Regarding "Pilot Study Facility Construction", JICA Study Team requested to Niger side to expedite and push the following subjects to be taken immediately. The Team would also clarify the Authority in charge for Operation & Maintenance (O&M), for both Central government and Local Government.
    a) Land acquisition
    b) Supplies in water and electricity must be assured before the exploitation
    c) The Pilot Station must be fenced
    d) Some one should be designated to take care of the exploitation
    e) A budget should be made to cover the cost of maintenance and exploitation.

For the best looking after the development of the measures above, the Study Team wish to know the names of departments or institutions service concerned by these subjects.

6. The Study Team informed to the Niger side and confirmed the demarcation of JICA Sanitation Improvement Project and other projects, which will be implemented by World Bank and other donor Agency only for Niamey City.

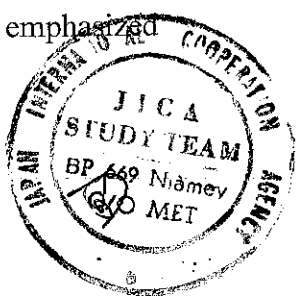
RESPONSIBILITY OF PILOT PROJECT

ITEMS	UASB Plant	JYOKASO Plant
Responsible Agency	Ministry of Equipment and Transports: Direction de l'Urbanisme, de l'Habitation et de la Construction	Ministry of Education : Direction des Etude set de la Programmation (DEP)
Receiving Agency	CUN & Commune I	Niamey Education Committee (NEC)
Authority in charge of O&M	CUN & Commune I	Niamey Education Committee
Authority in charge of Daily Routine Work	Commune I	Bandabari Primary School II

7. The Study Team strongly requested to MET to expedite action for water and electricity supply installation at the UASB Pilot plant site. It has already passed several weeks (letter ref. No. JT-0908 date 8th September to Secretary General, MET; M/M dated 18th September 2000) since it was agreed by MET to start procedural work for installation of these supplies and till now nothing has been informed to Study Team regarding Who does What with Whom (Vide an attached copy of the letter).

    Similarly, CUN is also strongly requested to acquire 1,310 m^2 of land from the landowner of UASB pilot plant site as soon as possible. Without land acquisition, work on UASB pilot plant cannot be started. CUN will be solely responsible for delay in implementation of pilot project (vide an attached copy of map).

8. Concerning the Urban Planning and Land Use, the following topics were emphasized at the S/C.



a) The population is expected to grow as projected in the Progress Report, and the population increase will be most significant in the urban periphery.

b) The land use classification for residential use as well as urban activities well takes into account the current conditions of Niamey, and the land use forecast is based on reasonable assumptions.

c) Foreseeable problems of urban development in Niamey are very serious and need to be addressed through this Study as well as other projects.

d) The Ministry of Equipment and Transports said that the evolution of Niamey is based on old census of more than 12 years. The Study Team said again that the information is based on hypothesis. In case of important projections, the measurements for the installations will be very costly in the investment and in the exploitation.

9. With the "Pilot Study Facility Construction" approving from JICA/HQ, the Team presented and suggested the policy of Hygiene Education in order to carry out it through Pilot Study. The actual detail programme will be introduced in IT/R, which will be submitted in the middle of March 2001.

10. Translations of tables and figures in the Progress Report:
Tables and figures in the Progress Report should been written in French. The Study Team will put back the document in French language including the tables and figures in the future reports.

11. Deadline for submitting comments
The comments on the Progress Report will be submitted to the Study Team in a week time that is Friday 3rd November 2000 latest.

RESPONSIBILITY OF HYGIENE EDUCATION

Hygiene Education	In UASB Plant Site	In Jyokaso Plant Site
Responsible Agency	- Ministry of Public Health: Division of Public Hygiene (DHP) and Division of Information on Health Education (EPS) - Ministry of National Education: Direction des Etudes et de la Programmation (DEP)	- Ministry of Public Health: Division of Public Hygiene (DHP) and Division of Information on Health Education (EPS) - Ministry of National Education: Direction des Etudes et de la Programmation (DEP)
Authority in charge of Hygiene education and Campaign	- CUN - Commune I	- CUN - Commune II - Niamey Education Committee (NEC) - Bandabari Primary School II
Others	- In order to implement hygiene education programs effectively, positive community participation is necessary. - Therefore, leading community organizations, groups, associations, NGOs and so on near by each pilot project site shall be selected and coordinated by each responsible Authority of the project for preparing hygiene campaigns in advance, which are proposed to conduct next June in accordance with the project progress.	

Attachment

LIST OF ATTENDANTS

Nigerien side

Ministry of Equipment and Transports (MET)

Mr. Mahamadou HALIDOU	Secrétaire Général
Mr. Daouda RABIOU	Directeur Général de l'Urbanisme de l'Habitation et de la Construction
Mr. Combari M. BONIFACE	Directeur de l'Urbanisme et de l'Habitat
Mr. Ousseini HAMZA	Chef Service Central de l'Assainissement et des Infrastructures Urbaines
Mr. Mahamdou CISSE	Service Central de l'Assainissement et des Infrastructures Urbaines

Ministry of Planning (MOP)

Mr. Akreba GHABDOU	Chef Division Assainissement

Ministry of Environment (MOE)

Mr. Malam Saidou SANOUSSI	Chargé de Programmes (SLPN)

Ministry of Public Health (MSP)

Mr. Ibrahim Issa BAARE	Directeur de l'hygiène et de l'éducation pour la Santé DHP/EPS

Ministry of Water Resources (MWR)
Mr. Hamidou GARBA

Ministry of Foreign Affairs, Cooperation, and African Integration (MFA)

Mrs. Absi FATOUMATA

Ministry of Education (MEN)
Mr. Ousmane ZAKARI

The Urban Community of Niamey (CUN)

Mr. Koko BOUREIMA	Directeur des Etudes et de la Programmation
Mr. Abdou ADAM	Homologue

Japanese side

Study Team

Mr. Kaoru SUZUKI	Team Leader / Urban Sanitation
Mr. Masaru OGAWA	Sewerage / Drainage Planning
Dr. Lalit K. AGRAWAL	Water Quality Analysis
Mr. Kenichi TAKESHITA	Facility Planning and Design
Mr. Tadao FUNAMOTO	Facility Planning and Design
Dr. Abdelaziz BELHERAZEM	Solid Waste Management (1)
Mr. Hiroshi ABE	Solid Waste Composition Analysis / Solid Waste Management (2)
Dr. Christian ROUVIERE	Social and Environmental Consideration
Mr. Kenji IGARASHI	Hygiene Education
Mr. Hiroyuki AKASO	Urban Planning and Land Use
Mr. Atsushi ITO	Interpreter / Translator

JICA/ JOCV

Mr. Noriki ASAHI	Resident Representative
Mr. Yoshinobu SUGIYAMA	Expert, Ministry of Foreign Affairs, Cooperation and African Integration

THE JICA STUDY TEAM ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY IN REPUBLIC OF NIGER

Tel: ++227 72 49 05 Fax: ++227 72 49 04 Mobile: ++227 90 16 66 Email : jicateam@intnet.ne

Date: 08 September 2000

Re: Request For Necessary Action For the Pilot Project on the Sanitation Improvement for the Niamey City in The Republic of Niger.

Ref: No JT-0908

To: M. Mohamadou HALIDOU
Secretary General,
Ministry of Equipment and Transports (MET),
BP 669 Niamey, Republic of Niger

Kind Attention: Messrs. Rabiou DAOUDA, Director General of Urbanism H/C (MET)
Mahamadou Combari BONIFACE, Director of Urbanism

Dear Sir,

This has reference to the Minute of Meeting (M/M) dated 25th August 2000 of above Project, which has held in the Project Office, MET. The Team are directed to say to request MET to take necessary action to be taken for the above Project.

As per the M/M (page 3) on the Inception Report (IC/R), dated 28th July 2000, in the implementation of the Pilot Project, the Nigerien side is required to under take such necessary measures as the followings:

UNDER TAKING OF THE NIGERIEN SIDE FOR THE PILOT PROJECT

1. To take necessary procedure concerning the "Droits Fonciers Coutumiers".
2. To provide facilities for the distribution of electricity from Nigelec and Water supply from SNE.
3. To construct the Gate, Fence and/or wall for two proposed sites.
4. To pay for ever for the electric bill and water bill to the said Authorities.
5. To continue the sustainable O&M such as getting rid of screen rubbish and grit/sand out the side of plants, etc.

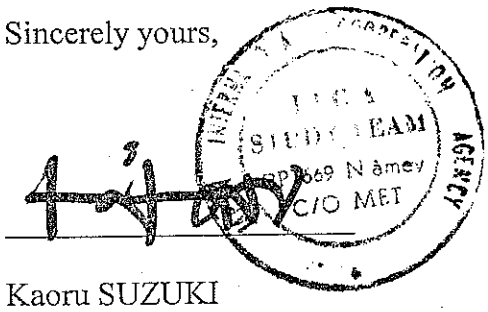
JICA Study Team would assist to involve this matter towards the Test Run and/or Trial Run of the Plants.

JICA STUDY TEAM BP 669 Niamey C/O MET

We are ready to discuss and present the detail for this matter at the Counterparts Meeting, which will be held on Friday 22, September 2000 in the Project Office.

We hope this can be acceptable for MET. Anxiously awaiting your reply, we remain.

Sincerely yours,



Kaoru SUZUKI
Team Leader,
JICA Study Team

Encl: Above

c.c. 1: Mr. Yoshio HORIOCHI
Resident Representative,
JOCV / JICA Office.
Tel: 73 55 69
Fax: 73 29 85

MINUTES OF MEETING
ON THE INTERIM REPORT

FOR THE STUDY
ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY
IN THE REPUBLIC OF NIGER, PHASE II

AGREED UPON BETWEEN

THE MINISTRY OF EQUIPMENT AND TRANSPORTS

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY STUDY TEAM
NIAMEY, 13th JUNE, 2001

Mr. Rabiou DAOUDA
Director General,
Ministry of Equipment
and Transports

Mr. Kaoru SUZUKI
Team Leader,
JICA Study Team,
The Japan International
Cooperation Agency

In accordance with the Scope of work agreed between the Republic of Niger (hereinafter referred to as "the Government of Niger" (GON)) and Japan International Cooperation Agency (JICA) on March 6th, 2000 the Study Team submitted the Interim Report (IT/R) for the Study on Sanitation Improvement for the Niamey City in the Republic of Niger (10 copies in English and 20 copies in French) and had an official meeting on 16 March, 2001 and 13 June 2001. The IT/R was accepted in principle at the official meeting. Main points of discussion made at the time for the IT/R submission are as follows:

1. Interim Report (IT/R)

JICA Study Team submitted the IT/R two months before and explained result for Master Plan (M/P) to the Nigerian Side. The Team presented the outline of Master Plan toward the target year, and reported the priority of each Sanitation Improvement Project for the field wise followed by Feasibility Study (F/S). Both Niger side and JICA side confirmed that the following issues were the outline of the Master Plan (M/P) for field wise.

(1) Sewerage/Drainage

According to the evaluation of Master Plan Projects, C3 sewerage zone were selected to the priority Projects that will be carried out the Feasibility Study at the phase II of this Study. The purpose of priority Projects are following issues.

- Improvement of hazard risk for flooding area
- Water Environmental Protection
- Reuse of Effluent from WWTP.

(2) Solid Waste Management

Through the explanation and evaluation of Master Plan, Introduction of New Waste Collection System and Construction of disposal sites were selected as priority projects to conduct the Feasibility Study in phase II of the study. The Feasibility Study of Introduction of New Waste Collection System shall be done through the study of 3 model projects (Project A: for Terminus, Niamey Bas, Cite Faycal and Poudrier, Project B: for Dar Es Salam and BaniFandou I, Project C: for Zongo, Maourey, Gandacthe, Deizebon and Boukoki I, II, III and IV).

(3) Hygiene Education

The review of hygiene education conditions has led to the identification of priorities for

the hygiene education plan. The plan is conceived as a cycle of public awareness heightening campaigns which dynamics will be moved by a concept of the Community Participation Approach and evaluation of campaigns, and tend toward the following:

- Continuous effort to maintain health / hygiene awareness levels
- Developing an intermediate up-grading step through a participation approach and dialogue between Communities and Authorities
- Finally integration the long term purpose of an urban environment consciousness.

The JICA study team will support during the feasibility study stage an awareness heightening campaign in pilot sites taking benefit of the projects demonstration value and the existing schools in both sites. Main targets will be children and local community. At the Bandabari site messages will be appropriate use of *Jokaso* facility, hygiene and health, and mutual understanding. And at the Dezeibon site those will be hygiene and health, mutual understanding, and local participation.

(4) Social and Environmental Consideration

The environmental review, including both social and natural considerations as well as institutional analysis and initial examination of impacts of the project, had concluded to the need of an EIA of the master plan during the feasibility study stage. The EIA study will be made according to the draft of TOR and will be based on analytical studies and field surveys. There are 3 types of field surveys to be performed within the scope of the EIA:

- Ecological study of waste water outlets sites (mainly Niger river)
- Social studies of sanitation facilities sites (mainly waste water treatment plants and waste landfill sites)
- Environmental study of waste landfill sites (physical considerations)

(5) Institution, Economic & Financial Analysis

To initialize the drainage and sewerage services, basic principles, required functions, organization and legal arrangement to support the service provider were defined and proposed in the master plan. Further, detailed procedures to prepare such institutional arrangement will be discussed with the Nigerian side in the course of the feasibility study. The Nigerian side indicated no objection to the proposals.

2. Pilot Study Facility Construction

The Team expressed a deep appreciation to Nigerian Side for the arrangement of

inauguration ceremony of Jyokaso Pilot Plant at Bandabri Primary School II. Both Niger side and JICA side confirmed that current situation of Pilot Plant are now on going for construction of UASB plant and operation of Jyokaso plant.

(1) Jyokaso Pilot Plant

The Team handed over the Bandabari Pilot Plant to operate and maintain by CUN staff and Schoolteachers, providing that the Team will carry out the monitoring of the Plant and evaluate the performance of Plant till the middle of September 2001. On the other hand, Sanitation Education will be just started at above School by schoolteachers to the children. Bandabari Primary School II and the parents association have already taken necessary action to the Authority to supply power to the Pilot Plant continuously.

(2) UASB Pilot Plant

The Team together with the sub-contractor expedited the construction of UASB Pilot Plant so as to start to operate and treat the raw sewerage as scheduled.
The Team also informed that UASB Plant will be completed on the end of June 2001 and Monitoring will be started after July onwards till the middle of September 2001.
Regarding to the power supply to the UASB Plant, the MET will take necessary action for power supply to the site from October 2001 with transferring the name of charge MET.

(3) Operation and Maintenance Structure

After inauguration and hand-over ceremony, the Team will commence the O&M through OJT and T/T to the engineers and technicians at each site. During a period of transition from the Team to the new structure for the Pilot Plants, the Team would assist and support actively to operate and maintain the Plants by themselves in order to observe the self-help. The Team would suggest MET and CUN that pilot Plants will be operated and maintained by Nigerian Side with following structure.

RESPONSIBILITY OF PLANTS STRUTURE

ITEMS	UASB Plant	JYOKASO Plant
Responsible Agency	Ministry of Equipment and Transports: Direction de l'Urbanisme, de l'Habitation et de la Construction	Ministry of Education: Direction des Etude set de la Programmation (DEP)
Implementation Agency	MET	Niamey Education Committee & CUN
Authority in charge of O&M	MET & CUN	CUN
Authority in charge of Daily Routine Work	CUN & Commune I	Bandabari Primary School II

3. The Technical Seminar and Campaigns

The Team announced and informed that the first technical seminar will be held on the third week of June 2001 and the second technical seminar will be held on the third week of September 2001 to practice for public involvement (PI).

The Team requested MET to establish the secretariat to see to it that two technical seminars would be proceeded smoothly.

The both sides confirmed that the details are to be finalized later on at secretariat.

4. Sub-Contract Work for Phase II

The team announced that following survey should be launched shortly:

- Topographical survey
- Geological and soil survey
- Demand survey on pre-collection and sand sorted out
- Hygiene campaigns
- EIA
- Monitoring Work for Pilot Study of two plants

MINUTES OF MEETING

ON THE DRAFT FINAL REPORT

FOR THE STUDY

ON SANITATION IMPROVEMENT FOR THE NIAMEY CITY

IN THE REPUBLIC OF NIGER

AGREED UPON BETWEEN

THE MINISTRY OF EQUIPMENT AND TRANSPORTS

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY STUDY TEAM

NIAMEY, 21st SEPTEMBER, 2001

Mr. Rabiou DAOUDA
Director General,
Ministry of Equipment
and Transports

Mr. Kaoru SUZUKI
Team Leader,
JICA Study Team,
The Japan International
Cooperation Agency

1. Introduction

JICA submitted the Draft Final Report (hereinafter referred to as DF/R) for the Study on Sanitation Improvement for the Niamey City in the Republic of Niger that had been conducted in accordance with the Scope of Work agreed and signed on March 6th, 2000.

The discussion was made at the time of DF/R submission, and concluded the following main points. The list of the attendants is attached as Appendix A:

2. Draft Final Report (DF/R)

(1) Acceptance of DF/R
The Niger side has in principle accepted the DF/R that JICA study team submitted. Prior to the official acceptance, the Steering Committee (S/C) and the Study Team agreed the contents of DF/R.

(2) Comments on DF/R
Both Japanese and Niger sides confirmed that Niger side would make the comments on DF/R, if any, and send them to the JICA/JOCV Niger office no later than October 31st, 2001.

3. Discussion on DF/R

According to the results of M/P clarified in DF/R, the JICA Study Team (hereinafter referred to as "the Team") reported the priority of each Sanitation Improvement Project for the field wise. Then the Team carried out the Feasibility Study (F/S) with the counterparts for four months in Niamey, Niger. The following discussion was held at the Steering Committee (S/C) on the outcomes of the Study.

(1) Sewerage / Drainage
Based on the priority project of Master Plan (M/P), Boukoki Area was chosen for the F/S area toward year 2005. Both Niger and Japanese sides agreed that the major issues for Sewerage/Drainage are to construct the trunk main drainage and wastewater treatment plant.

(2) Solid Waste Management
The priority projects for Solid Waste Management have been presented according to the DF/R. Niger side understood the importance of the projects. The projects include new waste collection system and construction of Disposal Sites.

(3) Environmental Impact Assessment
The EIA study has proposed a set of measures to eliminate or mitigate the undesirable side effects of the project. Both Niger and Japanese sides confirmed that, with application of

measures, the implementation of the project would improve the quality of the urban environment and the sanitary conditions of the Niamey citizens without inducing negative impacts on the natural and social environment.

(4) Institution, Economic & Financial Analysis

Both Niger and Japanese sides confirmed that organizational structure for O & M proposed in the JICA study was vital in maintaining the sanitation improvement facilities (e.g., sewerage works, solid waste management) that could be constructed according to the F/S (Feasibility Study). Niger side understood that the foreign assistance would be highly unlikely substantiated unless the proposed organizational arrangement was completed. On this issue, Niger side stated clearly that it would carry out the reconstructing of relevant institutions within approximately 12 months on condition that Niger side would find out the funding agency that could provide at least 11 (eleven) million US dollars, initial costs for implementation of F/S.

(5) The Funding Agencies

Particularly with regard to institutional arrangement shown in (4) shown above, JICA side proposed Niger side that it would explain to the major funding agencies, such as African Development Bank, Islamic Development Bank and World Bank, the necessity and urgency of financial assistance by sending the official letter co-signed by both the minister of MET and mayor of CUN. The Niger side promised the Japanese side that the letter would be sent no later than one month after the submission of Final Report (F/R).

(6) PRSP Formulation

Poverty Reduction Strategy Paper or PRSP is planned to be completed by December 2001. Niger side promised the Japanese side that it would facilitate the proposed Niamey City's sanitation improvement plans to be acknowledged [mentioned] in PRSP as one of the effective and efficacious means to tackle the country's most serious environmental problems.

4. Evaluation of Wastewater Treatment Technology

(1) Jyokaso Pilot Plant

Ever since Jyokaso System started operation in the middle of March 2001, Communaute Urbane de Niamey (CUN) has carried out the Operation and Maintenance (O&M) for six months with the counterparts. The Team has monitored the wastewater quality during the study period. Based on the outcome of analysis, both Niger and Japanese sides acknowledged that the Jyokaso Technology is applicable to the domestic wastewater treatment subject to the proper O&M which is required as the minimum efforts for the local government.

(2) UASB Pilot Plant

UASB Pilot Plant has been commissioned from the end of June 2001. Good authentic "Sludge Blanket" has been produced in the Reactor, and the stabilization of sludge itself has been observed since one month and a half after the operation started. Both Niger and Japanese sides acknowledged that the UASB pilot plant is effective in treating the wastewater in Niamey.

5. Operation and Maintenance of UASB Pilot Plant in Deizebon

Niger side stated that the MEH/AT will transfer the UASB Plant to CUN on September 22nd, 2001 for the appropriate and sustainable O&M which will be controlled by the existing organization.

6. Summary of the On Job Training and Technology Transfer

During the Team's stay in Niamey, Niger, the Team has carried out the technology transfer to the counterparts on the following crucial issues since July 2000.

- Project Management through Developing Study
- Construction Management through Pilot Plants
- Applying to the "Capacity Building" for human resource through above Project management.

7. The Second Technical Seminar

Complied with the recommendations of first Technical Seminar which was held middle of June 2001, the Team and Niger side held the Second Technical Seminar on September 20th, 2001. The Team presented the outcome of F/S and its possibility of implementation.

8. Publication of the Reports

Concerning the Study Report of this Project, the Niger side agreed that all the Study Reports would be open for disclosure.

9. Donation of Machinery and Materials

Regarding the Machinery and Materials purchased by JICA as listed Appendix B, Niger side proposed the Japanese side that it would submit the donation request letter to JICA

Headquarter addressed to "the Managing Director, Social Development Study Department, JICA". In this regard, the Niger side promised the Japanese side that it would arrange the exemption to the custom duties if necessary. Japanese side understood the proposal and demanded the Niger side to take the necessary administrative steps as quickly and smoothly as possible.

10. Evacuation from Project Office

The Team thanked the Niger side from the bottom of its heart for all the cooperation, and promised to evacuate the Project office at the end of September 2001 immediately.

Appendix A:

LIST OF ATTENDANTS

Nigerien side

Ministry of Equipment and Transports (MET)

Mr. Daouda RABIOU	Directeur Général de l'Urbanisme de l'Habitation et de la Construction
Mr. Combari M. BONIFACE	Directeur de l'Urbanisme et de l'Habitat
Mr. Mahamdou CISSE	Chef Service Central de l'Assainissement et des Infrastructures Urbaines
Mr. Ousseini HAMZA	Service Central de l'Assainissement et des Infrastructures Urbaines

Ministry of Planning (MOP)

Mr. Akreba GHABDOU	Chef Division Assainissement

Ministry of Environment (MOE)

Mrs. Maimouna SANDA	ME/LCD/SLPN

Ministry of Public Health (MSP)

Mr. Morou ALI	DHP/ES

Ministry of Water Resources (MWR)

Mr. Nayamma Issoufou GAOH

Ministry of Foreign Affairs, Cooperation, and African Integration (MFA)

Mr. Moustapha INOUSSA	DAMAO

The Urban Community of Niamey (CUN)

Mr. Abdou ADAM	Homologue
Mr. Mamouda BACHIROU	

Japan International Cooperation Agency (JICA)

Mr. Mahamoud MOUSSA

Japanese side

Advisory Committee

Prof. Dr Masahiro MURAKAMI	Team Leader/Urban Environmental Management
Mr. Mikio TANI	Administration for Sewerage System

Study Team

Mr. Kaoru SUZUKI	Team Leader / Urban Sanitation
Mr. Tadao FUNAMOTO	Sub-Team Leader / Facility Planning and Design
Dr. Lalit K. AGRAWAL	Water Quality Analysis
Mr. Jean J. COUSTALINE	Pilot Sewerage Treatment
Mr. Kenichi TAKESHITA	Facility Planning and Design
Dr. Abdelaziz BELHERAZEM	Solid Waste Management
Dr. Christian ROUVIERE	Social and Environmental Consideration
Mr. Judo HAGIWARA	Construction Planning / Cost Estimation
Mr. Haley Hiromasa MINAKAMI	Institution/Economic & Financial Analysis
Mr. Atsushi ITO	Interpreter / Translator
Mr. Taketoshi ISHIHARA	Team Administrator

Appendix B:

List of Machinery and Materials purchased by JICA

N°	Item Description	Qty.	Specification	Remarks
Procured in Niger				
1	Refrigerator	1	LIDO	200 Liters
2	Telephone Set	1	Panasonic KX-TS10MX-W	
3	Facsimile Machine	1	Panasonic KX-FM131	
4	Copy Machine	1	XEROX 5025	
Procured in Japan				
5	Reagent for Wastewater Treatment	60 kg	Soduim Hypocloride	Expendable supply
6	Load Checker	1	Truck Scale	
Procured in the Third Country				
7	JYOKASO Plant Equipment	2 sets	Blower Machine	
		2 sets	Air Valve	
		4 m	PVC Pipe (ϕ 100mm)	
		10 pcs.	Nuts (for Manhole Cover)	
8	UASB Plant Equipment	1 set	See attached table	
Constructed in Niger				
9	JYOKASO Plant	1	Q = 10 m^3/day	Bandabari
10	UASB Plant	1	Q = 100 m^3/day	Deizebon

REPUBLIQUE DU NIGER
MINISTERE DE L'EQUIPEMENT ET DES TRANSPORTS
Direction Générale de l'Urbanisme De l'Habitat et de La Construction
Direction de l'Urbanisme

Niamey,

Observations on the draft final report of " The study on sanitation improvement for the Niamey city"

I. FORM AND GENERAL COMMENTS

I.1 Summary Report:
Generally the report contains several mistakes that should be corrected. They area listed in the following:
ES1: 2nd Paragraph, Objective of the Study: change to: **The study area is encompassed....**

ES3: 4th Paragraph, change to: ...**with 13 UASB WWTP and**..., it should be 14 instead 13.

ES7: 3rd Paragraph, ... **tariff has to be set slightly higher than 754 CFA Francs**... Please show the reference tariff, in order to appreciate the increase.

ES8:
1st Paragraph, **the society's financial position will be.... through the 60 year project**, should be clarified
2nd Paragraph, **the annual operation cost will be 350 million CFA Francs** have to be born by the municipalities within the target year 2005

ES10: Point 13 should be translated (in the French version the title is given in English).

ES11: 1st Paragraph, change to: the investment costs of the priority projects

Page S1: Chapter S1.2, **The study area is encompassed with about 23,900 ha for urban.**

Page S4: Chapter S3.5, 3rd Paragraph, delete last sentence

Page S11: Please make consistent the number of habitants (Population) of both Tables; 993,724 or 993,772 (these data are in Table S5.1 and S5.2)

Page S13: Chapter S6.2, Please add, as an advantage: production of methane gas that can be used

Page S20: Chapter S7.4, 2nd Paragraph, change to: **For the design of the landfill and the estimation of the waste quantities...**

Page S22: Chapter S8.1, minor comment (French language). It will be considered by Bel yan
Chapter S8.3, Table S8.1: The total of the urbanized surface (7,628.7 ha) is different from the figure given on page S.3 (8,800 ha) for the same zone, Please harmonize.

Page S.24, Point (3), 2nd sentence, it is written: **For S11 zone, stabilization pond system shall be applied as the WWTP area is available near the zone and therefore no long transfer line is necessary,** which WWTP is speaking about?

Page S.20 (it wrong it should be Page S.29), 3rd Paragraph, to be changed to: C1 to C4 instead C1 and C4.

Page S.32, last Paragraph, 5th line: minor comment, it will be corrected in the French version.

Page S.36: Chapter S12.3, last sentence: **If effective tariff revenue of water supply in Niamey is assumed as 6,000 million in 2016, then 18.2 percent would be added to the water bill.** This amount seems to us to be very high, please clarify more.

Page S.46, Chapter S16.3, last Paragraph, 2nd sentence, minor comment, it will be corrected in the French version.

Chapter S16.4, 2nd Paragraph, first sentence, to be changed: However, since the drainage and sewerage service is a new public utility in Niger…,

Page S.49, Figure S17.1: should be Zone of Boukoki instead Zone de Deizibon.

Page S.51, Figure S17.2: No open channel is existing at Boukoki.

Page S.58, 1st sentence: minor comment, it will be corrected in the French version.

Page S.72, Table S21.2, data for population, waste water flow and collected waste water seems to be wrong.

Page S.74, 3rd line, minor comments, it will be corrected in the French version.

5th line, delete the sentence, it has no meaning.

Page S.77, 1st line: Please mention the damages that are important

Page S.79, 2nd Paragraph: minor comment, it will be corrected in the French version.

I.2 Main Report

As for the Summary Report, the Main Report contains several mistakes that have to be corrected. The comments on the Interim Report that were made in June 2001 have not been considered. The report is not well presented. The report would be better in a file, where copies of any page can be done easily.

Finally the Final version of the Main Report should be more synthetic (global and gives more general picture) and do not contain several repetitions and useless parts.

I.3 Appendix

Appendices are supporting documents for better understanding of the text part of the Report, therefore they should be translated in to French to allow us, a better understanding of the Report. Some figures (numbers) of tables can not be red, particularly in the calculation tables. The size (font) should be increased.

I.4 Drawings

A general plan (Layout) for the network of the City should be elaborated and over handed to MET at scale 1/10,000 or 1/5,000. It should show the different phases of the project, existing network, and planed construction work in 2002, 2003 to 2015. It has also to show the different types of sewerage system.

It has been agreed that the recycling centers should be materialized. We are waiting for the scheme. The sites that are expected within the Feasibility Phase, should also be shown.

II. FUNDAMENTAL COMMENTS

The Study has presented very pertinent analysis and made very interesting propositions in order to improve sanitation in the City of Niamey as well as at the Master Plan Stage as at The Feasibility Stage.
However the calculations sheets should be readable in order to permit us further use of the report.

Legend:

It not clear to me, what they want to ask. I will contact Mr Hamza and ask him.

The answers for these comments are very simple. Bel yan will consider them in the French version.

In my point of view, very important and should be answered

APPENDIX B: NOMINATION OF COUNTERPART

REPUBLIQUE DU NIGER

MINISTERE DE L'EQUIPEMENT
ET DES TRANSPORTS

DIRECTION GENERALE DE
L'URBANISME DE L'HABITAT ET
DE LA CONSTRUCTION

DIRECTION DE L'URBANISME
ET DE L'HABITAT

Niamey, le 10 AOUT 2000

N° 166 DGUH/C

NOTE DE SERVICE

Les agents dont les noms suivent sont désignés homologues permanents à l'équipe de la JICA chargée de l'étude sur l'amélioration de l'Assainissement de la ville de Niamey comme suit :

- Monsieur OUSSEÏNI HAMZA pour le volet eaux usées.
- Monsieur MAHAMADOU HAMIDOU CISSE pour le volet eaux pluviales.

RABIOU DAOUDA

Ampliations :

SG	1 ATCR
DGUHC	1
DU	1
SCA-IU	1
Equipe JICA	1
CHRONO	1

1/8/00

REPUBLIQUE DU NIGER

MINISTERE DE L'EQUIPEMENT
ET DES TRANSPORTS

SECRETARIAT GENERAL

Niamey, le - 2 AOUT 2000

LE SECRETAIRE GENERAL

A

Monsieur le Secrétaire Général de la Communauté Urbaine de Niamey.

N° 0 0 0 9 2 /SG/ME/T

Objet : Etude sur l'amélioration de l'assainissement de la ville de Niamey.

J'ai l'honneur de vous demander de bien vouloir désigner un agent de la Communauté Urbaine de Niamey ayant des connaissances dans le domaine de l'assainissement et spécialisé dans les questions d'ordures ménagères pour servir en qualité d'homologue permanent à l'équipe japonaise chargée de l'étude.

Par ailleurs je vous demande de bien vouloir tenir l'ensemble du personnel de la Direction des Services Techniques comme homologues pouvant être mobilisés de façon ponctuelle et périodique.

Cette disposition a été prévue dans le document intitulé « Etendue des Travaux » dont je vous parvenir une copie à toutes fins utiles.

Une prompte réaction de votre part m'obligerait.

REPUBLIQUE DU NIGER * Ministère de l'Equipement et des Infrastructures * LE SECRETAIRE GENERAL

MAHAMADOU HALIDOU

AMPLIATIONS :
ME/T
SG/ME/T
DGUH/C
DUH
CHRONO

REPUBLIQUE DU NIGER
COMMUNAUTE URBAINE DE NIAMEY
DIRECTION DES AFFAIRES FINANCIERES
ET DU PATRIMOINE

N° 1004 /PPCUN/DAF/P

Niamey, le 22 AOUT 2000

LE PREFET- PRESIDENT DE LA COMMUNAUTE URBAINE DE NIAMEY
A
MONSIEUR LE SECRETAIRE GENERAL DU MINISTERE DE L'EQUIPEMENT ET DES TRANSPORTS
NIAMEY

Objet : Désignation d'un homologue et des contreparties pour l'étude de l'amélioration de l'assainissement de la ville de Niamey.
Réf : V/L N°00092/SG/MET DU 2/8/00

En réponse à votre lettre ci-dessus référencée, j'ai l'honneur de porter à votre connaissance, la désignation de Monsieur Adam Abdou, Urbaniste D.P.L.G, en qualité d'homologue permanent pour l'étude citée en objet. L'intéressé possède, en effet, une maîtrise des principaux thèmes couverts par l'étude.

Par ailleurs, le personnel suivant se tient à la disposition de l'équipe en guise de contre partie il s'agit à titre indicatif :

- **Monsieur Koko Boureïma, Ingénieur Principal des Travaux Publics, Directeur des Etudes et Programmes**
- **Monsieur Seydou Kayaba, Ingénieur du Génie Sanitaire, Chef Service Assainissement**
- **Monsieur Oumarou Bako, Technicien d'Assainissement**
- **Monsieur Adamou Issa, Administrateur Civil, Directeur des Affaires Financières et du Patrimoine**
- **Monsieur Amadou Souley, Urbaniste, Chef du Service des Affaires Domaniales**
- **Monsieur Ousseïni Gonomi, Directeur des Services Techniques**
- **Monsieur Mamane Idi, Conseiller Economique**
- **Monsieur Hamidou Garba, Chef Service Voirie**

REPUBLIQUE DU NIGER
COMMUNAUTE URBAINE DE NIAMEY
AMADOU SALIFOU

République du Niger

Niamey le 22 Février 2001

Ministère de l'Équipement et des Transports

Direction Générale de l'Urbanisme de l'Habitat
Et de la Construction

Direction de l'Urbanisme

N° ...../DGUH/C

NOTE de SERVICE

Monsieur Mounirou Hassimi, Ingénieur Géomètre Adjoint au service Central de l'assainissement est mis à la disposition de l'équipe d'étude de la JICA pour le suivi et la supervision des travaux de construction de l'usine pilote UASB à compter du 22 février 2001.

Rabiou DAOUDA

Ampliations :

Chef d'équipe JICA	1
DGUA/C	1
DU	1
Intéressé	1
Chrono	1

APPENDIX C: SUB-CONTRACT WORKS

C.1 TOPOGRAPHIC SURVEY

TERMS OF REFERENCE

1.General

1.1 All measurement in the topographic survey shall be recordes in metric units.

1.2 The Surveyor is responsible for providing all survey equipement relating to the work.

1.3 Any other Terms of refrence required shall be discussed by the Client and the Surveyor.

1.4 The Surveyor shall submit the following reports before the survey.

1) Survey Equipement list
2) Survey method report
3) Work schedule

1.5 The size of drawings.

1) the result of survey shall be plotted by the Surveyor on the maps wich the Client supplies, and with a scale 1:10.000..
2) The longitudinal profilling shall be 1:10.000 for horizontal and 1.100 for the vertical

2. Detailed Description of Survey

The topographic survey for the study area shall include leveling, longitudinal profilling, Plane Table survey and with accuracies as shown in the following:

Ground levels shall be measured at 80 meter intervals (TP : turning points) and levels of road crossings and other additional points (IP: intermediate points) where the ground slopes changes suddenly such as crossings of railways, canals and drains, shall also be measured. In these cases, heights of railways, bottom levels of canals and drains, and roads levels before after these obstacles shall be measured together with the distance from the nearest IP.

3. Levelings

Setting of temporary Bench Marks

1) BM ; 5 locations

3) Accuracy of survey

Within 10mm$\sqrt{S}$ (level circuit).

Where; S= distance of one way in km.

TERMS OF REFERENCE

1:General

1.1 All measurement in the Soil survey shall be recorded in metric units.

1.2 The Contractor is responsible for providing all survey equipment relating to the work.

1.3 Any other Terms of Reference (TOR) required shall be discussed by the Client and the Contractor.

1.4 The Contractor shall submit the following reports before the survey.

1) Soil Survey Equipment list
2) Soil Survey Method Report
3) Work Schedule

1.5 The Size of Drawings.

1) The result of Soil survey shall be plotted by the Contractor on the A4 and/or A3 sizes.

2. Detailed Description of Soil Survey

The Soil surveys for the Study area shall include following details:

2.1 Boring / Standard Penetration Test

(h = 30m) * 5 points = 150 m

2.2 Soil Investigation

(30m / 6) * 5 points = 25 pcs (every 6m)

2.3 Item for Test

1) Mobilization
2) Density
3) Granulometry
4) Sedimentometry
5) Limits Atterberg
6) Natural Water Tenor
7) Essay Protector
8) Essay CBR
9) Essay RIP
10) Essay Consolidation

2.4 Reports

French	= 4 Sets
English	= 4 Sets

APPENDIX C3. PUBLIC AWARENESS SURVEY

SURVEY QUESTIONNAIRE ABOUT HOUSEHOLDS PRACTICES AND AWARENESS IN THE FIELD OF HYGIENE AND SANITATION

A. GENERAL INFORMATION
B. PRACTICES AND AWARENESS
C. EDUCATION AND AWARENESS HEIGHTENING
D. HEALTH

Identification of area (quarter) and compound	
Identification of household	
Identification of persons who answered to the questionnaire (chief of household, housewife, others)	
Identification of the interviewer	
Number of families in the compound	

a) Check the number in respect of the answer given.
b) When question needs a written answer, write in the last column.
c) In case of answer belonging to "others" case, write the new proposed item in the last column.

A.	1. Total number of persons in the interviewed household?			
	2. Number of persons who have income, in the household?			
	3. Average monthly income of the household?		1. Less than 30.000CFA 2. Between 30.000 and 50.000CFA 3. Between 50.000 and 100.000CFA 4. More than 100.000CFA	
	4. Socio-professional category of the chief of household?		1. Without employment or informal sector 2. Agriculture 3. Commerce 4. Government officer 5. Office employee 6. Factory	

			employee 7. Others	
	5. Number of rooms in the house?		1. One room 2. Two rooms 3. Three rooms 4. More	
	6. How many years have you been living in this house (number of years)?			
	7. To which ethnic group do you belong?		1. Haoussa 2. Djerma 3. Peul 4. Touareg 5. Others	
	8. Have you farm animals in your house?	1. NO	2. YES	3. I DO NOT KNOW
	9. What kind of animals and how many heads?		1. Cows 2. Goats 3. Hens (chicken) 4. Donkeys 5. Others	Number:
	10. Which is the level of education of the household chief?		1. No scholar education 2. Primary school 3. Secondary school 4. High school, university 5. Others	
	11. Which is the level of education of the housewife?		1. No scholar education 2. Primary school 3. Secondary school 4. High school, university 5. Others	
B.	12. Are you provided with any service of collection of waste?	1. NO	2. YES	3. I DO NOT KNOW
	13. Type of collection service?		1. Public container 2. Authorised deposit 3. Collection service at the compound by a private organisation 4. Others	
	14. If you do not receive waste collection service, how do you do in order to dispose of your waste?		1. Temporary storage outside the compound 2. Use for enrichment of cultivated fields 3. Discharge in a non authorised deposit site 4. Others	
	15. Who is in charge of handling the waste bin and disposing of waste		1. Children 2. Young women	

	outside?		3. Young boys 4. Servant 5. Housewife 6. Chief of household 7. Others	
	16. Have you toilets in the compound?	1. NO	2. YES	3. I DO NOT KNOW
	17. Type of toilets?		1. Rudimentary latrines 2. Improved latrines 3. Septic tank 4. Others	
	18. Do you think that waste materials can still be used after they have been disposed of outside?	1. NO	2. YES	3. I DO NOT KNOW
	19. Type of use?		1. For feeding cattle 2. For embanking street against flooding 3. For enrichment of cultivated fields 4. For other purpose	
	20. Do you think that a good collection of waste and their disposal in good conditions to improve salubrity of the city is a priority action to be done?	1. NO	2. YES	3. I DO NOT KNOW
	21. Have you ever paid for getting waste in order to bank up road in front of your compound?	1. NO	2. YES	3. I DO NOT KNOW
	22. If yes, did you find that banking up streets with waste material had advantages (which one)?	1. NO	2. YES	3. I DO NOT KNOW
	23. Do you sometimes suffer damages from flooding in your house?	1. NO	2. YES	3. I DO NOT KNOW
	24. Do you protect yourself against flooding by your own means?	1. NO	2. YES	3. I DO NOT KNOW
	25. How?		1. By embankment to protect against waters 2. By draining waters outside the compound 3. Others	
	26. What do you think is the most important problem to be resolved in the city in order to improve your living conditions?		1. Unemployment 2. Cleansing of public place 3. Waste collection services 4. Inadequacy of health care services 5. Drainage of water runoff against flooding	

			6. Collection of waste water 7. State of degradation of roads 8. Lack of public transportation services 9. Density of trafic 10. Others	
	27. Are you satisfied by the present system of sanitation (waste, waste water, drainage) as organised by the urban community?	1. NO	2. YES	3. I DO NOT KNOW
	28. Point of satisfaction or dissatisfaction?	1.Waste water collection 2.Waste collection 3.Drainage of rain water 4.Others	5.Waste water collection 6.Waste collection 7.Drainage of rain water 8.Others	
	29. Have you ever complained to the commune about your salubrity problems?	1. NO	2. YES	3. I DO NOT KNOW
	30. Object of the complaint?		1. Lack of waste collection 2. Lack of protection against flooding 3. State of unsalubrity of streets 4. Others	
	31. If you did suffer some problems but did not complain, why did you not complain?		1. Useless 2. Lack of motivation 3. Postponed 4. Others	
C.	32. Do children receive any information at school about hygiene rules?	1. NO	2. YES	3. I DO NOT KNOW
	33. Have you ever received advice from city officials about hygiene and salubrity?	1. NO	2. YES	3. I DO NOT KNOW
	34. Type of advice?		1. To dispose of the household waste correctly in authorised places 2. To maintain the compound clean (waste bin, yard, toilets) 3. To adopt hygiene rules in the household (hands and body hygiene) 4. Others	
	35. Have you ever participated in	1. NO	2. YES	3. I DO NOT KNOW

	cleanliness campaigns or campaigns to improve public salubrity conditions of surroundings?			
	36. If no, are you however ready to collaborate in cleansing campaigns in order to contribute to improve public salubrity conditions of surroundings?	1. NO	2. YES	3. I DO NOT KNOW
	37. If yes, who did participate among the members of your family?		1. Adult women (housewife) 2. Adult men 3. Children 4. Young 5. Others	
	38. If women do not participate, is it because you think that their participation in community actions or campaigns is not a task for women?	1. NO	2. YES	3. I DO NOT KNOW
	39. What was the purpose of the cleanliness campaigns which you have heard about or contributed to?		1. Appropriate storage of waste in the waste bins or containers 2. Eradication of the waste deposit sites 3. Cleansing of public places, street sweeping 4. Protection measures against malaria vectors 5. Hygiene practices at home 6. Others	
	40. How do you receive the information when an awareness campaign is launched?		1. Newspaper 2. Radio 3. Direct contact taken by the municipal officials 4. Association 5. TV set 6. Others	
	41. Do you remember which organisation was in charge of the execution of the campaign?	1. NO	2. YES	3. I DO NOT KNOW
	42. Type of organisation?		1. Local organisation of quarter 2. Association 3. Municipality 4. Urban community 5. Health services 6. Others	
	43. Do you think that these campaigns are useful and should be reinforced?	1. NO	2. YES	3. I DO NOT KNOW

	44. Does anyone in your household belong to any group of volunteers to regularly cleansing the streets of your quarter?	1. NO	2. YES	3. I DO NOT KNOW
	45. Type of belonging		1. Quarter association 2. National association 3. Others	
	46. Are you ready to pay for improving the salubrity conditions?	1. NO	2. YES	3. I DO NOT KNOW
D.	47. Do you know that waste disposed of in streets are a source of bad health?	1. NO	2. YES	
	48. Do you know that waste water discharged in streets are a source of bad health?	1. NO	2. YES	
	49. Does the housewife play an important role at home for maintaining or improving good health of the family?	1. NO	2. YES	3. I DO NOT KNOW
	50. Which kind of role?		1. Daily hygiene education of children 2. Care for drinking and cooking water 3. Cleansing of toilets and yard 4. Cleansing of kitchen 5. Care for family health 6. Others	
	51. If housewife has no any role in terms of health care as mentioned above, then who takes such responsibility?		1. Chief of household 2. Elderly 3. Others	

SURVEY QUESTIONNAIRE ABOUT PRACTICES AND AWARENESS OF INDUSTRIES AND INSTITUTIONS IN THE FIELD OF URBAN SANITATION

A. ACTIVITIES
B. SOLID WASTE
C. LIQUID WASTE AND SLUDGE
D. PERCEPTION AND INTENTION
E. SALUBRITY AND HEALTH

Identification of the person who answered to the questionnaire:	*Name:* *Status:* *Phone number:*
Identification of the interviewer:	*Name of interviewer:* *Date of interview:*
Identification of the industry / institution:	*Address:* *Activity (designation and code):*

A.	1. Which is the location of the activity?	1. City centre 2. Peripheral area 3. Shopping area 4. Industrial area 5. Residential area 6. Niger riverside 7. Others		
	2. Total number of workers, including executives?			
	3. Number of executives only?			
	4. Annual turnover (FCFA)?			
	5. Category of business / activity	1. Office 2. Hotel 3. "Maquis" catering 4. Small street catering 5. Restaurant 6. Market 7. Shops 8. Small street selling 9. Handicraft 10. Industry 11. Hospital, clinic 12. School, university 13. Garage 14. Others		
	6. Characterisation of the activity?	1. Informal sector 2. Reprocessing, recycling 3. Public institution 4. Private institution 5. Others		
B.	7. What is the main type of solid waste that is generated by your activity?	1. Domestic garbage 2. Waste food 3. Paper and / or cardboard 4. Glass and / or other inert materials 5. Plastics and PVC 6. Wood and plants 7. Animals waste		

		8. Ferrous metallic and iron scraps 9. Mineral 10. Construction / demolition waste 11. Textile 12. Oil 13. Sludge 14. Others		
	8. Does your activity generate dangerous waste or waste containing toxic substances or infectious waste?	1. NO	2. YES	3. I DO NOT KNOW
	9. Have you installed any kind of pre-treatment process of the generated solid waste, with following alternatives?		1. By sorting out special waste (dangerous, toxic, infectious) materials 2. By sorting out recyclable / reusable materials at source 3. By selling the recyclable materials 4. Others	
	10. Without or following such pre-treatment, how do you dispose of your solid waste?	1. In containers for collection by municipality 2. In containers for collection by private collectors 3. Direct transportation to an authorised disposal site 4. Direct transportation to a non-authorised disposal site 5. Direct transportation to a deposit site belonging to the industry or institution 6. In situ disposal on its own site (private) 7. Deposit in the street 8. In-situ discharge as street embankment material 9. In-situ disposal as a temporary solution until a final solution can be found 10. Discharge in street gutters 11. Burning 12. Incineration 13. Others		
	11. In case of direct transportation toward a fixed disposal site, what kind of site is it?	1. Roadside 2. River side 3. Near the Niger river 4. Open field of private ownership 5. Open field of public		

		ownership 6. Others 7. Not specified or not known		
	12. Can you localise the site of concern?	1. In the city of Niamey 2. In the peripheral area of Niamey 3. Outside Niamey city 4. Others 5. Not specified or not know		
	13. Do you take any specific measures in order to avoid the sanitary negative effects that are possibly induced by waste?	1. Cleansing around the container 2. Coordination with the waste collection service to avoid the surplus of waste in containers 3. Selection of appropriate site for disposal, outside the city 4. Obtaining an administrative authorisation for disposal 5. Others		
	14. Are you provided with a waste collection service?	1. NO	2. YES	3. I DO NOT KNOW
	15. Who is organising this collection service?	1. Municipality 2. Cleansing private enterprise 3. Private enterprise of waste materials recovering 4. NGO 5. Others		
	16. Which is the average frequency of waste collection, per week?	1. Less than once 2. One to two times 3. Two to three times 4. More than three times 5. Every day 6. Others		
	17. Is the waste collection service regularly provided?	1. NO	2. YES	3. I DO NOT KNOW
	18. If you deposit your waste in a container for facilitating collection, which type of container is used?	1. Container 5 m3 2. Metallic barrel 3. Metallic dust bin 4. Wheelbarrow 5. Plastic bags 6. Others		
	19. Where are lying the containers?	1. On a private place 2. On a public place 3. Others		
	20. Which kinds of waste do you put inside the container?	1. Domestic garbage 2. Waste food 3. Paper and / or cardboard 4. Glass and / or other inert materials 5. Plastics and PVC 6. Wood and plants 7. Animals waste		

		8. Ferrous metallic and iron scraps 9. Mineral 10. Construction / demolition waste 11. Textile 12. Oil 13. Sludge 14. Others		
	21. Do you directly reuse or recycle the sub-products and waste materials in your place of activity?	1. NO	2. YES	3. I DO NOT KNOW
	22. Do you use recyclable materials waste as raw materials in your place of activity / production?	1. NO	2. YES	3. I DO NOT KNOW
	23. Do you transport or do you sell recyclable materials toward an external recycling unit?	1. NO	2. YES	3. I DO NOT KNOW
	24. Or is it the recycling enterprise which does come to collect or buy waste on your place of activity?	1. NO	2. YES	3. I DO NOT KNOW
	25. If you effectively send recyclable materials, which materials are they?			
	26. Are these materials of local origin (Niamey) or not?	1. NO	2. YES	3. I DO NOT KNOW
	27. At which price do you sell your recyclable materials (FCFA per ton)?			
C.	28. What is the water resource used for drinking water?	1. Shallow well 2. Deep well 3. Municipal supply 4. River 5. Others		
	29. Case of industrial units: What is the water resource used in the production process?	1. Shallow aquifer 2. Deep aquifer 3. Municipal supply 4. River 5. Others		
	30. Have you installed a system of water reuse or water recycling?	1. NO	2. YES	3. I DO NOT KNOW
	31. Do you discharge domestic waste water?	1. NO	2. YES	3. I DO NOT KNOW
	32. Does your activity generate industrial waste water or waste water containing toxic substances?	1. NO	2. YES	3. I DO NOT KNOW
	33. Case of industrial units: Do you make a pre-treatment of industrial waste water before final	1. NO	2. YES	3. I DO NOT KNOW

	discharge?			
	34. If yes, what kind of preliminary treatment is it?		1. Physical treatment (floculating, decanting) 2. Biological treatment 3. Chemical treatment 4. Others	
	35. Is this treatment plant under effective operation?	1. NO	2. YES	3. I DO NOT KNOW
	36. If this treatment plant is in operation, what is its capacity (m3/day)?			
	37. Case of industrial units: Which is the current pattern of discharging industrial waste water?	1. Contract agreed with a waste water collection service provider 2. Evacuation in the municipal network of waste water collectors 3. Evacuation in the municipal network of rain water collectors 4. Evacuation in the Niger river 5. Evacuation in a river or ravine 6. Evacuation in a pond or morphologic depression 7. Others		
	38. How do you dispose of your domestic waste water?	1. Contract agreed with a waste water collection service provider 2. Evacuation in the municipal network of waste water collectors 3. Evacuation in the municipal network of rain water collectors 4. Evacuation in the Niger river 5. Evacuation in a river or ravine 6. Evacuation in a pond or morphologic depression 7. Others		
	39. Case of industrial units: Does your activity generate industrial sludge waste / treatment sludge waste?	1. NO	2. YES	3. I DO NOT KNOW
	40. Case of industrial units: How do you dispose of your industrial sludge / treatment sludge?		1. Discharge together with solid waste 2. Transportation to a disposal site 3. Evacuation through a sludge collecting service provider 4. Stocking on site 5. Direct discharge in a ravine, a river, or the Niger river	

			6. Others	
D.	41. Are you satisfied with the solid waste collection service?	1. NO	2. YES	3. I DO NOT KNOW
	42. How do you find this collection service, what is the global level of satisfaction that you could attribute?	1. Good 2. Bad 3. Medium 4. No opinion		
	43. Which is the specific point (or several points) that you have considered in attributing such satisfaction level?	1. Collection frequency 2. Collection fee 3. Transportation fee / cost 4. Collection conditions 5. Cleanliness conditions of the waste deposits 6. Others		
	44. Do you know what are your obligations for the evacuation of your solid and liquid waste in the best conditions?	1. NO	2. YES	3. I DO NOT KNOW
	45. Have you ever been informed about guidelines or methods for the evacuation of your solid and liquid waste in the best conditions?	1. NO	2. YES	3. I DO NOT KNOW
	46. If yes, by who?		1. Sanitary authority 2. Municipality 3. Inspector of environment 4. Cleansing association 5. Others	
	47. Does your present practice follow such directives or guidelines?	1. NO	2. YES	3. I DO NOT KNOW
	48. Do you know if the waste that you are generating are or are not a source of nuisance?	1. NO	2. YES	3. I DO NOT KNOW
	49. Which kind of nuisance is it?			
	50. Do you pay a tax or fee for discharging waste water?	1. NO	2. YES	3. I DO NOT KNOW
	51. Do you pay a tax or fee for discharging solid waste or sludge?	1. NO	2. YES	3. I DO NOT KNOW
	52. If yes, what is the purpose of this tax or fee?		1. Collection service 2. Transportation service 3. Disposal of waste at disposal site 4. Others	
	53. If yes, how do you consider this tax / fee?		1. Justified 2. Unjustified 3. Excessive 4. Without opinion	
	54. Are you satisfied with your current practice of disposal of solid or liquid waste?	1. NO	2. YES	3. I DO NOT KNOW

	55. Do you plan to improve your solid or liquid waste management practice?	1. NO	2. YES	3. I DO NOT KNOW
	56. How?		1. Decreasing the quantity of generated waste 2. Decreasing the toxicity or danger of generated waste 3. Improving the performance of waste collection 4. Increasing the reuse or recycling of materials or water of the production process 5. Introducing a treatment plant 6. Developing an appropriate disposal site 7. Others	
	57. Do you feel responsible for the good disposal of your solid waste?	1. NO	2. YES	3. I DO NOT KNOW
	58. Do you feel responsible for the good disposal of your liquid waste?	1. NO	2. YES	3. I DO NOT KNOW
E.	59. What are the sanitation measures taken in the work place?	1. Availability of water and soap 2. Rudimentary latrines 3. Improved latrines 4. Modern flush water toilets 5. Maintaining cleanliness of dust bins and waste deposit places 6. Others		
	60. Have you established awareness heightening programs / actions in the work place for the employees and about sanitation and health?	1. NO	2. YES	3. I DO NOT KNOW
	61. Have you established awareness heightening programs / actions in the work place for the public about sanitation and health?	1. NO	2. YES	3. I DO NOT KNOW
	62. What is the rate or frequency of absenteeism justified by medical reason?	1. Frequent 2. Not frequent 3. Rare 4. Others		
	63. Are the employees medically supervised?	1. NO	2. YES	3. I DO NOT KNOW
	64. What are the diseases the most frequently found during such medical supervision, in the work place?			

C.3 PUBLIC AWARENESS SURVEY

TERMS OF REFERENCE (TOR)

1.GENERAL

1.1 The Contractor is responsible for providing all survey equipment relating to the work.

1.2 Any other Terms of Reference (TOR) if required should be discussed by the Client and the Contractor.

1.3 The Contractor shall submit the following reports before the survey.

1) Public Awareness Survey Method Report

2) Work Schedule

1.4 The Size of Report.

1) The result of Public Awareness survey shall be submitted by the Contractor on the A4 sizes.

2. OUTLINE OF THE WORK

1) Purpose of Survey
   - To get the necessary information for establishing the master plan on sanitation improvement
   - To get the necessary information for sanitary education program
   - To understand residents consciousness

2) Survey Items
   - Status of sanitary condition
   - Status of water utilization
   - Status of water and sewage (water usage, water and sewer connection, water and sewage tariffs, etc...)
   - Status of solid waste disposal
   - Resident's ability to pay for water and sewage service
   - Status of water flood in the past
   - Education level
   - Knowledge about hygiene
   - Extent of concern about city problem

3) Number of Samples
   - Households: 300
   - Industries and institutions : 100

4) Sampling Method

Niamey city will be zoned initially to get the typical data for the zone. Samples will zoned as equally as possible to allocate same number of samples to each zone. Within each zone, samples will be selected so that a wide sampling area could be covered as far as possible and a uniform sampling could be ensured.

5) Survey Method

The surveyor will visit individual households and industries and institutions in view to conduct an interview based on a questionnaire. The area for each surveyor to visit will be designated in advance as a sampling zone on the map. The surveyors will visit a predetermined number of samples households / industries / institutions so that uniform sampling would be ensured.

Five surveyors (one lead surveyor and four assistant surveyors) will be employed, with the lead surveyor employed for about one month and the assistant surveyors for about two weeks.

3. WORK SPLIT

Work Item	Client	Contractor
1. Preparation of questionnaire (English)	X	X
2. Translation of questionnaire to French	X	
3. Printing of questionnaire		X
4. Preparation of interviewing		X
5. Interview		X
6. Data input of the interview results		X
7. Summarizing the results and Reporting (French and English)		X
8. Analysis of the report	X	

4. REPORTING

Four (4) copies of the Report, each for English and French, shall be submitted.

TERMS OF REFERENCE (TOR)
FOR
THE WASTEWATER QUALITY TESTING AND MEASUREMENT

1.WASTEWATER QUALITY TESTING

(1) Sewer & Drainage

Eight sampling points shall be determine for taking wastewater from the existing sewer & drainage and taken 10 samples from 06.00 hours to 24.00 hours. (8sites × 10 samples = 80 samples).

Sampling shall be carried out every two hours from 06.00 hours to 24.00 hours (10 samples per site).

Simultaneously, domestic wastewater flow shall be measured every two hours at each site (10 measurements per site).

(2) Typical Enterprises and Institutions

Five enterprises shall be chosen for wastewater quantity & quality testing (5 samples).

The background information, which includes number of employees, water use, and toilet types shall be obtained at each sampling point.

(3) Typical Industries

Five enterprises shall be chosen for wastewater quantity and quality testing (5 samples).

The background information, which includes number of employees, water use, and toilet type shall be obtained at each sampling point.

(4) Supplementary sampling

According to field survey, the Study Team will instruct 10 supplementary flow measurement and sampling in order to make sure about water quantity & quality testing for the Study by the contractor.

2. ANALYSIS ITEMS

For each sample, following items shall be analysed:

2-1 Sewer

Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids, Total Coliform Number, T-N, T-P, Oil & Grease, pH and Temperature

2.2 Drainage

Biochemical Oxygen Demand (BOD), Total Coliform Number, T-N, T-P, pH and Temperature

2-3 Typical Enterprises and Institutions

Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids, T-N, P, pH and Temperature

2-4 Typical Industries

Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids, Normal Hexane Extract, Phenol, pH and Temperature

3. METHOD OF FLOW MEASUREMENT AND WATER QUALITY ANALYSIS

Flow shall be measured by weir or equivalent method.

Laboratory analysis of the water samples for every item shall be relates sections of "Standard Methods for the Examination of Wastewater" published by APHA (American Public Health Association), AWWA (American Water Works Association) or equivalent.

4. CONDITION OF WORK

- Flow measurement and sampling shall be done by contractor.
- Analysis and reporting to be done by contractor.

5. REPORTS

Four (4) copies of the Report, each for English and French, shall be submitted.

Table D-1 Locations and Number of Wastewater Flow Measurement and Sampling

Items	Survey Items	Number of Flow & Sampling	Locations
Sewer & drainage	Flow & sampling	10 & 10 (6.00 hours to 24.00 hour every two hours)	Channel 1 (UASB site)
	Flow & sampling	Same as above	Channel 2 (near the bridge)
	Flow & sampling	Same as above	Channel 3 (downstream of BraNiger channel)
	Flow & sampling	Same as above	Channel 4
	Flow & sampling	Same as above	Channel 5
	Flow & sampling	Same as above	Channel 6
			Drainage 1 (Meeting point of river and drainage near BraNiger)
	Flow & sampling	Same as above	Drainage 2 (Down stream of UASB site)
Typical Enterprises & Institutions	Flow & sampling (with background information)	5 & 5 ~10 am at 5 locations	1.Hotel Gaweye 2.Hopital National 3.University 4.Soni Bank 5.Administration building
Typical Industries	Flow & sampling (with background information)	5 & 5 ~10 am at 5 locations	1.BraNiger 2.SPCN 3.ENITEX 4.Niger Lait 5.Tannery Gamkalle

Table D-2 List of Water Quality Analysis

Paramter	**Sewer & drainage**	**Typical Enterprises and Institutions**	**Typical Industries**	**Total**
Ambient Temperature	80	5	5	90
Water Temeprature	80	5	5	90
pH	80	5	5	90
BOD	8	5	5	18
COD	6	5	5	16
SS	6	5	5	16
T-N	8	5		13
T-P	8	5		13
Oil & Grease	6			6
Normal Hexane Extract			5	5
Phenol			5	5
Total Coliform Number	8			8
			Total Analysis	100*

*Excluding Temperatures and pH, which has not be counted under analysis item.

TERMS OF REFERENCE

1.General

1.1 All measurement in the Solid Waste survey shall be recorded in metric units.

1.2 The Contractor is responsible for providing all survey equipement relating to the work.

1.3 Any other Terms of Refrence(TOR) required shall be discussed by the Client and the Contractor.

1.4 The Contractor shall submit the following reports before the survey.

1) Solid Waste Equipment list
2) Solid Waste Survey Method Report
3) Work Schedule

1.5 The Size of Drawings.

1) The result of Solid Waste survey shall be plotted by the Contractor on the A4 and/or A3 sizes.

2. Detailed Description of Solid Waste Survey

The Solid Waste surveys for the Study area shall include following details:

2.1 Survey on leachate

2.1.1 Objective

To make analysis on leachate at final disposal sites used at present in each district.

2.1.2 Location

There are three final disposal sites (one disposal site for each district) used at present.
Two (2) samples for each final disposal sites shall be surveyed

3 disposal sites × 2 samples = 6 samples.

2.1.3 Scope of works

a .Sampling

b. Analysis

c. Reporting

2.1.4 Analysis

PH, COD (Chemical Oxygen Demand), SS Suspended Solids), Normal Hexane Extract, Coliform Number, Phenol, Copper, Iron, Manganese, Chromium.

2.2 Survey on soil contamination

2.2.1 Objective

To make analysis on soil contamination at former final disposal site in each district.

2.2.2 Location

There are three former disposal sites (one disposal site for each district). Two (2) points for each final site shall be surveyed.

3 disposal sites × 2 points = 6 points

2.2.3 Scope of works

a. Sampling
b. Field observation
c. Analysis
d. Reporting

2.2.4 Analysis items
Hg, Cd, Pb, Organic-Phosphate, Cr, CN, As

2.3 Survey on Solid Waste quantity and composition

2.3.1 Objective
To obtain basic data for estimating solid waste generation, collection ratio, and average solid waste composition in the Niamey City.

2.3.2 Location
Niamey city consists of three district. To survey solid waste generation amount and composition, two (2) blocks from each district shall be select.

2.3.3 Scope of works

a. Solid waste amount survey at source (8 days)
b. Solid waste composition survey
c. Solid waste amount survey collected at the block (8days)
d. Laboratory analysis
e. Reporting

2.3.4 Conditions of survey

(1) Solid waste amount survey at source

a. Interview of household (Number of family, Activity, Discharge of solid waste, Request for cooperation). Number of household is 300. (3 districts × 2 blocks × 50 houses = 300 houses).
b. Delivery of collection bags to each house.
c. Collection of waste from each house and measurement of weight (survey shall be continued for 8 days).
d. Analysis of unit generation rate of solid waste.

(2) Solid waste composition survey

a. Taking sample (Two samples from each block × 6 blocks = 12 samples)
b. Physical composition
Weight of waste shall be measured after classified to following items.
Material such as plastic bottle, branch, etc., will be also measured
- Paper, Plastic, Textile, Leather/rubber, Grass, Food waste, Metal, Glass, Ceramic/stone, Other (under 5mm)

c. Laboratory analysis

Moisture content shall be measured for above 10 items and ash content shall be measured 7 items (excluding metal, glass and ceramic/stone) for each sample.

- Moisture content: 12 sample x 10 items = 120 items
- Ash content: 12 sample x 7 items = 84 items

(3) Solid waste amount survey collected at the block (8 days)

Solid waste amount collected at the block shall be measured at final disposal site. Portable truck scale will be prepared by the JICA study team to measure the collection vehicle weight. Number of block shall be 6 blocks. Survey shall be continued for 8 days.

2.4 Reporting

Four (4) copies of the report, each for English and French, shall be submitted.

Necessary information in the quotation

- Cost for survey with unit cost breakdown
- Necessary number of surveyors
- Necessary tools.

RESULTS OF SOLOD WASTE WEIGHING SURVEY

Results of solid waste weighing survey

District : Lacouroussou

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
	Lacroussou				1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	Lac 1-A	5	5	3	5	10	5	8	7	4	42
	"	2	Lac 1-B	4	4	3	2	6	3	3	5	2	24
2	"	3	Lac 2-A	4	6	4	4	4	3,5	6	8	5	34,5
	"	4	Lac 2-B	4	1	1	2	1	1	2	1	2	10
3	"	5	Lac 3-A	7	3	1	5	6	7	4	3	3	29
	"	6	Lac 3-B	4	10	3,5	3	6	3	2	5	4	26,5
	"	7	Lac 3-C	7	1	2	5	4	2	5	4	4	26
	"	8	Lac 3-D	10	6	2	1,5	2	3	1	7	8	24,5
4	"	9	Lac 4-A	20	9	17	11	12	12	11	12	7	82
	"	10	Lac 4-B	9	3	2	5	1	4	4	5	3	24
	"	11	Lac 4-C	8	3	3	4	4	3	6	3	4	27
5	"	12	Lac 5-A	8	6	8	12	7	5	15	8	9	64
	"	13	Lac 5-B	4	7	1	7	5	1	5	3	3	25
	"	14	Lac 5-C	15	5	8	8	7	9	5	6	6	49
6	"	15	Lac 6-A	7	3	2	0	8	0	22	9	7	48
	"	16	Lac 6-B	3	4	7	0,5	4	4	5	3	4	27,5
7	"	17	Lac 7-A	8	3	1	8	2	3	3	3	2	22
	"	18	Lac 7-B	4	4	6	10	12	5	3	3	3	42
8	"	19	Lac 8-A	13	3	3	0	5	0	0	0	1	9
	"	20	Lac 8-B	2	6	8	8	5	5	6	11	4	47
9	"	21	Lac 9-A	6	12	1	1	18	1	1	1,5	9	32,5
	"	22	Lac 9-B	2	2	4	2	5	5	1,5	3	2	22,5
10	"	23	Lac 10-A	4	0	5	5	3	3	4	1	5	26
	"	24	Lac 10-B	10	9	6	15	16	12	10	14	4	77
	"	25	Lac 10-C	1	0	1	0,5	0,5	0,5	1	0,5	5	9
	"	26	Lac 10-D	4	0	2	4	3	3	2	3	3	20
	"	27	Lac 10-E	1	1,5	4	2	3	3	0	2	2	16
11	"	28	Lac 11-A	2	4	9	3	2	2	2	3	3	24
	"	29	Lac 11-B	4	3	5	3	3	1	2	4,5	7	25,5
12	"	30	Lac 12-A	2	8	6	13	7	12	19	19	11	87
13	"	31	Lac 13-A	6	7	5	4,5	5	2	2	5	2	25,5
	"	32	Lac 13-B	3	1	0,5	5	0,5	1	0,5	0,5	0,5	8,5
	"	33	Lac 13-C	5	3	3	0,5	9	3	9	12	8	44,5
	"	34	Lac 13-D	7	9	8	2	2	1,5	2	3	4	22,5
14	"	35	Lac 14-A	3	9	2	7	3	7	3	3	2	27
	"	36	Lac 14-B	6	3	4	3	3	4	4	6	4	28
	"	37	Lac 14-C	3	5	3	7	8	9	9	3	6	45
15	"	38	Lac 15-A	10	6	3	10	8	6	4	5	2	38
	"	39	Lac 15-B	3	5	13	11	9	6	5	16	8	68
	"	40	Lac 15-C	2	6	7	7	6	6	5	6	3	40

Appendix C.5 - 1

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
	Lacroussou				1	2	3	4	5	6	7	8	Total (2 - 8)
16	"	41	Lac 16-A	2	12	21	17	29	23	12	17	13	132
	"	42	Lac 16-B	4	10	16	1	3	7	6	7	4	44
	"	43	Lac 16-C	4	9	9	12	13	6	10	12	5	67
17	"	44	Lac 17-A	3	6	11	10	13	9	7	5	8	63
	"	45	Lac 17-B	5	1	3	5	5	2	1,5	5	1	22,5
	"	46	Lac 17-C	3	4	16	19	11	6	8	15	13	88
18	"	47	Lac 18-A	7	2	3	2	3	4	5	4	1	22
	"	48	Lac 18-B	3	2	2	2	2	3	1,5	2	3	15,5
	"	49	Lac 18-C	7	2	1	2,5	5	3	2	3	3	19,5
	"	50	Lac 18-D	5	3	2	5	4	3	3	2	3	22
19	"	51	Lac 19-A	3	20	7	10	10	14	5	10	10	66
	"	52	Lac 19-B	7	7	9	6	4	5	15	1,5	5	45,5
	"	53	Lac 19-C	4	5,5	6	5	10	4	4	7	3	39
	"	54	Lac 19-D	7	9	7	9	6	6	7	5	8	48
	"	55	Lac 19-E	3	4	1	0,5	1,5	0,5	1	0,5	1	6
	"	56	Lac 19-F	3	3	8	6	4	3	5	5	3	34
20	"	57	Lac 20-A	8	30	7	24	35	0	34	27	19	146
	"	58	Lac 20-B	5	15	6	8	10	6	4	24	8	66
Total		**20**											
Total households			**58**										
Nber of Persons				**313**									
Total (2 - 8)													**2315,5**
Average generation rate (waste quantity generated per day and capita)													**1,05**

Results of solid waste weighing survey

District : Lamordé

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
	Lamordé				1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	Lam 1-A	6	2	3	5	6	3	4	9	3	33
	"	2	Lam 1-B	5	9	0	3	4	7	8	6	8	36
	"	3	Lam 1-C	6	12	2	5	3	5	7	3	3	28
2	"	4	Lam 2-A	6	3	3	3	3	3	2	3	6	23
3	"	5	Lam 3-A	7	9	6	7	11	11	12	5	11	63
	"	6	Lam 3-B	6	11	8	10	6	9	12	8	7	60
4	"	7	Lam 4-A	13	4	0	9	4	20	10	7	9	59
5	"	8	Lam 5-A	14	9	9	8	5	4	3	6	5	40
6	"	9	Lam 6-A	13	3,5	7	4	7	7	6	6	8	45
7	"	10	Lam 7-A	30	9	5	6	5	8	11	2	11	47
8	"	11	Lam 8-A	7	20	4	1	3	1	2	3	1	15
9	"	12	Lam 9-A	17	12	2	5	14	6	5	6	10	48
10	"	13	Lam 10-A	15	5	3	3,5	9	4	1	2	1	23,5
11	"	14	Lam 11-A	6	6	1	3	9	8	11	3	6	41
12	"	15	Lam 12-A	7	6	3	4,5	7	7	4	5	3	33,5
13	"	16	Lam 13-A	5	0	0,5	3	0	2	17	3	12	37,5
14	"	17	Lam 14-A	4	13	3	5	4	4	7	2	4	29
15	"	18	Lam 15-A	15	13	17	9	10	13	10	11	15	85
16	"	19	Lam 16-A	7	8	0	7	3	9	4	9	10	42
17	"	20	Lam 17-A	6	1	2	4	4	4	3	6	1	24
18	"	21	Lam 18-A	9	15	9	12	6	5	0	2	1	35
19	"	22	Lam 19-A	5	2	11	4	9	7	4	8	5	48
20	"	23	Lam 20-A	4	9	13	1	5	6	4	7	6	42
21	"	24	Lam 21-A	8	9	0	9	11	4	8	2	3	37
22	"	25	Lam 22-A	5	5	3	4	3	4	3	4	1	22
23	"	26	Lam 23-A	3	3	7	0	15	5	3	3	4	37
24	"	27	Lam 24-A	10	15	6	0	6	3	10	5	2	32
25	"	28	Lam 25-A	2	5	5	14	8	5	4	6	4	46
26	"	29	Lam 26-A	9	8	9	5	6	10	11	4	6	51
27	"	30	Lam 27-A	2	12	0	6	12	5	4	5	0	30
28	"	31	Lam 28-A	8	6	0	8	10	9	6	10	10	53
29	"	32	Lam 29-A	4	15	7	15	13	11	10	6	1	63
	"	33	Lam 29-B	4	9	5	8	5	4	7	8	3	40
	"	34	Lam 29-C	2	13	9	6	10	5	3	10	6	49
30	"	35	Lam 30-A	17	15	15	10	4	5	11	6	1	52
31	"	36	Lam 31-A	5	10	5	4	18	7	12	8	8	62
32	"	37	Lam 32-A	6	15	13	10	8	12	14	6	7	70
33	"	38	Lam 33-A	6	7	13	7	18	9	11	11	12	81
	"	39	Lam 33-B	5	5	5	7	8	11	10	2	13	56
	"	40	Lam 33-C	4	11	14,5	6	20	21	16	3	6	66,5

Appendix C.5 - 2

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
	Lamordé				**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total (2 - 8)**
34	"	41	Lam 34-A	8	0	2	6	19	9	14	10	5	65
35	"	42	Lam 35-A	20	5	9	15	7	8	16	5	16	76
36	"	43	Lam 36-A	10	11	2	7	12	7	8	2	7	45
37	"	44	Lam 37-A	5	6	4	10	7	7	8	2	8	46
38	"	45	Lam 38-A	15	1,5	9	9	10	1 1	9	9	9	66
39	"	46	Lam 39-A	7	8	24	18	15	6	11	12	6	92
	"	47	Lam 39-B	7	13	6	13	7	5	9	6	10	56
40	"	48	Lam 40-A	7	14	11	2	17	19	9	14	13	85
41	"	49	Lam 41-A	20	3	5	8	9	7	4	5	7	45
42	"	50	Lam 42-A	18	4	10	8	9	13	7	11	9	67
43	"	51	Lam 43-A	4	6	0	9	11	6	12	8	7	53
44	"	52	Lam 44-A	3	9	2	9	10	12	20	7	9	69
Total		**44**											
Total households			**52**										
Nber of Persons				**437**									
Total (2 - 8)													**2550**
Average generation rate (waste quantity generated per day and capita)													**0,83**

Results of solid waste weighing survey

District : Gawéye

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Gawéye					1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	G 1-A	8	3	1	5	1	3	1	9	4	24
	"	2	G 1-B	5	3	2	3	3	2,5	3	7	10	30,5
	"	3	G 1-C	9	6	1	8	3	4	2	4	2	24
	"	4	G 1-D	9	6	1	2	3	12	3	10	3	34
2	"	5	G 2-A	5	3	1	4	4	2	2	5	3	21
	"	6	G 2-B	3	2	1	4	4	6	3	4	8	30
	"	7	G 2-C	5	0	4	1	3	2	3	8	8	29
	"	8	G 2-D	2	1	1	6	2	1	4	1	2	17
	"	9	G 2-E	5	3	6	2	4	4	5	6	4	31
3	"	10	G 3-A	5	2,5	2	1	13	0,5	3	8	2	29,5
	"	11	G 3-B	6	13	0	4	6	7	1	2	7	27
4	"	12	G 4-A	10	0	0	2	5	5	5	4	1	22
5	"	13	G 5-A	9	2	3	2	2	3	4	2	1	17
	"	14	G 5-B	11	1	2	4	0,6	8	5	4	1	24,6
6	"	15	G 6-A	2	6	1	2	3	2	4	4	6	22
	"	16	G 6-B	4	3	2	1	8	5	5	4	2	27
7	"	17	G 7-A	8	3	1	1	6	2	1	1	3	15
	"	18	G 7-B	5	7	3	1	6	2	2	7	4	25
8	"	19	G 8-A	6	4	1	2	3	5	4	2	5	22
	"	20	G 8-B	6	2	8	4	8	2	7	8	3	40
	"	21	G 8-C	5	3	3	3	3	2	2	4	2	19
	"	22	G 8-D	5	2	2	1	7	6	4	7	5	32
9	"	23	G 9-A	4	7	1	0,5	10	4	1	12	2	30,5
	"	24	G 9-B	7	9	4	1	2	3	11	2	0,5	23,5
10	"	25	G 10-A	15	2	1	2	2	2	6	5	3	21
	"	26	G 10-B	10	4	2	1	2	2	4	1	4	16
	"	27	G 10-C	2	1	2	4	8	2	1	4	8	29
	"	28	G 10-D	4	1	4	2	2	4	4	9	1	26
11	"	29	G 11-A	14	2	1	1	1	0,5	1	4	7	15,5
12	"	30	G 12-A	4	4	2	3	7	3	1	2	6	24
	"	31	G 12-B	9	3	0,2	2	3	4	4	1	2	16,2
13	"	32	G 13-A	6	7	3	5	3	2	2	3	0,5	18,5
	"	33	G 13-B	13	5	5	3	5	4	0,5	4	1	22,5
14	"	34	G 14-A	2	1	2	1	2	2	1	2	7	17
	"	35	G 14-B	4	4	0,5	1	3	1	1	2	1	9,5
	"	36	G 14-C	3	0,5	0,1	1	1	2	9	1	8	22,1
15	"	37	G 15-A	3	3	0,5	2	2	2	8	3	5	22,5
	"	38	G 15-B	9	2	2	3	2	7	5	6	2	27
	"	39	G 15-C	5	2	2	2	5	0,5	4	5	2	20,5
	"	40	G 15-D	3	2	1	1	2	3	3	3	2	15

Appendix C.5 - 3

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Gawéye					1	2	3	4	5	6	7	8	Total (2 - 8)
16	"	41	G 16-A	11	3	2	4	6	10	4	7	2	35
	"	42	G 16-B	5	0	1	4	1	4	5	2	5	22
17	"	43	G 17-A	7	2	1	2	2	4	5	3	6	23
18	"	44	G 18-A	20	3	6	6	3	2	2	2	3	24
19	"	45	G 19-A	7	0,5	0,2	1	1,5	2	1	1	1	7,7
20	"	46	G 20-A	3	1,5	1	2	3	2	2	8	2	20
	"	47	G 20-B	8	1	1	2	3	3	3	2	2	16
	"	48	G 20-C	9	0,5	1	2	5	3	2	5	4	22
	"	49	G 20-D	5	1	0	1	3	1	8	4	2	19
	"	50	G 20-E	3	0,3	0,1	1	2	2	1	2	1	9,1
Total		**20**											
Total households			**50**										
Nber of Persons				**328**									
Total (2 - 8)													**1136,7**
Average generation rate (waste quantity generated per day and capita)													**0,49**

Results of solid waste weighing survey

District : Yantala

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Yantala					1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	YA 1-A	11	10	3	2	1	2	2	2,5	2	14,5
	"	2	YA 1-B	3	3	2	2	1	2	1	1,5	1	10,5
2	"	3	YA 2-A	15	4	6	5	3	5	2	1,5	2,5	25
3	"	4	YA 3-A	2	20	2	3	3,5	8	2,5	1,5	1	21,5
	"	5	YA 3-B	7	6	2	1	3	10	2,5	7	2	27,5
4	"	6	YA 4-A	4	5	2	3	2	2	3	2,5	0,5	15
	"	7	YA 4-B	4	4	3	15	5	6	4,5	5,5	9	48
	"	8	YA 4-C	3	3	6	4	3	2	4	2	2	23
	"	9	YA 4-D	4	0,5	3	3	2	2	3,5	2,5	2	18
	"	10	YA 4-E	3	2	2	2	1	2	3	2	0,5	12,5
5	"	11	YA 5-A	8	12	6	6	7	7	9	5	9	49
	"	12	YA 5-B	4	24	3	6	5	7	5	5	4,5	35,5
	"	13	YA 5-C	17	17	7	5	6	6	4	2,5	10	36,5
	"	14	YA 5-D	3	6	8	7	4	4	6,5	0	5,5	35
6	"	15	YA 6-A	5	3	3	5	1	3	4	1,5	2,5	20
	"	16	YA 6-B	7	6	7	5	5	6	2	3	4	32
7	"	17	YA 7-A	5	3	2	3	4	4	3,5	5	2,5	24
8	"	18	YA 8-A	11	12	4	7	4	5	2,5	4	6,5	33
9	"	19	YA 9-A	8	3	6	5	3	7	7	4	3,5	35,5
	"	20	YA 9-B	3	15	2	5	4	6	5,5	6	3	31,5
	"	21	YA 9-C	6	14	2	9	6	7	6	6	0	36
10	"	22	YA 10-A	4	6	12	7	2,5	9	9	4	6	49,5
	"	23	YA 10-B	9	3	16	6	6	6,5	6	3	10	53,5
11	"	24	YA 11-A	2	3	3	2	3	5	4	3	1,5	21,5
	"	25	YA 11-B	4	2	1	3	9	2	6,5	4	2	27,5
	"	26	YA 11-C	5	8	5	8	4	2	3	1	3	26
	"	27	YA 11-D	2	2	2	3	3	3	2	1	3	17
12	"	28	YA 12-A	19	5	16	12	14	10	18	7	13	90
13	"	29	YA 13-A	4	4	4	4	4	5	8,5	3	3	31,5
	"	30	YA 13-B	9	9	3	8	5	5,5	6	8	13	48,5
	"	31	YA 13-C	6	3	2	3	3	5	5	3	3,5	24,5
	"	32	YA 13-D	4	4	14	4	11	5	8	4	9	55
	"	33	YA 13-E	8	16	1	3	2	3	2	9	2	22
14	"	34	YA 14-A	23	8	2	2	7	4,5	7	9	8	39,5
15	"	35	YA 15-A	3	9	5	4	4	3	4,5	3	2	25,5
	"	36	YA 15-B	6	5	3	7	2	5,5	8	1,5	3	30
	"	37	YA 15-C	4	7	6	8	4	6	3	4	0	31
	"	38	YA 15-D	6	6	7	6	4	4	4	3	1	29
	"	39	YA 15-E	8	5	3	6	6	6	6	5	5	37

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Yantala					**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total (2 - 8)**
16	"	40	YA 16-A	15	6	0	11	20	25	19	10	0	85
17	"	41	YA 17-A	5	10	7	5	2	8	9	4	1,5	36,5
	"	42	YA 17-B	2	4	3	5	3	6	6	0,5	1	24,5
	"	43	YA 17-C	4	14	6	10	2	4	2	2	4	30
18	"	44	YA 18-A	7	8	9	6	7	5	17	6	7	57
	"	45	YA 18-B	3	3	3	5	6	2	6	6	6	34
	"	46	YA 18-C	3	7	5	8	6	9	15	5	2,5	50,5
	"	47	YA 18-D	4	3	3	2	1,5	2	9	1,5	2	21
	"	48	YA 18-E	7	3	4	5	2	2,5	6,5	1	4	25
19	"	49	YA 19-A	4	0	1	6	2	5	3	3	2	22
		50	YA 19-B	4	6	8	4	3	4	4	3,5	4	30,5
	"	51	YA 19-C	3	3	4	3	3	3	2	2	3	20
20	"	52	YA 20-A	6	5	6	4	9	7	12	3	8	49
	"	53	YA 20-B	4	2	5	7	0	6	7,5	3	3	31,5
	"	54	YA 20-C	7	2	3	5	2	9	4	4	4	31
	"	55	YA 20-D	6	3	6	6	4	3	11	7	2	39
	"	56	YA 20-E	4	0	8	4	7	18	10,5	8	7,5	63
	"	57	YA 20-F	6	9	7	10	9	5	5	7	11	51
Total		**20**											
Total households			**57**										
Nber of Persons				**353**									
Total (2 - 8)													**1945,5**
Average generation rate (waste quantity generated per day and capita)													**0,78**

Results of solid waste weighing survey

District : Kouara Koura

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Koira-Kano					1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	KK 1-A	4	7	8	2	6	11	5	7	4	43
2	"	2	KK 2-A	7	3	6	10	5	6	5	8	8	48
3	"	3	KK 3-A	7	2	3	6	3	0	8	1	10	31
4	"	4	KK 4-A	3	5	8	5	2	2	6	8	8	39
5	"	5	KK 5-A	3	1	1	3	1	4	1	2	1	13
6	"	6	KK 6-A	7	12	11	11	4	2	6	2	6	42
7	"	7	KK 7-A	8	2	4	5	1	0	0	0	4	14
8	"	8	KK 8-A	2	0,5	0,5	1	0,5	0,5	7	2	2	13,5
9	"	9	KK 9-A	8	6	4	4	2	6	3	2	4	25
10	"	10	KK 10-A	3	12	2	5	2	1,5	4	3	2	19,5
11	"	11	KK 11-A	9	1	3	1	2	1,5	3	2	4	16,5
12	"	12	KK 12-A	3	2	8	3	3	6	3	8	6	37
13	"	13	KK 13-A	9	2	8	11	5	3	14	5	4	50
14	"	14	KK 14-A	8	11	3	4	2	4	10	2	2	27
15	"	15	KK 15-A	7	3	2	3	2	2	4	3	5	21
16	"	16	KK 16-A	3	21	3	2	4	2	2	2	2	17
17	"	17	KK 17-A	3	1	6	2	4	6	5	4	2	29
18	"	18	KK 18-A	10	1	6	3	2	7	0	2	18	38
19	"	19	KK 19-A	6	10	6	2	11	2	3	2	2	28
20	"	20	KK 20-A	2	9	9	4	3	3	4	6	4	33
21	"	21	KK 21-A	6	2	10	6	6	9	5	2	6	44
22	"	22	KK 22-A	3	2	4	4	5	10	2	10	1	36
23	"	23	KK 23-A	6	5	11	6	4	4	6	5	4	40
24	"	24	KK 24-A	9	2	4	2	3	3	4	3	3	22
25	"	25	KK 25-A	12	5	3	2	11	10	5	5	6	42
26	"	26	KK 26-A	4	10	6	7	15	8	6	4	10	56
27	"	27	KK 27-A	5	9	8	8	16	8	6	3,5	12	61,5
28	"	28	KK 28-A	8	9	10	10	6	9	8	17	8	68
29	"	29	KK 29-A	9	2	3,5	6	9	6	6	18	6	54,5
30	"	30	KK 30-A	7	10	2	3	2	2	2	5	1	17
31	"	31	KK 31-A	3	10	3	0,5	2	6	8	2	5	26,5
	"	32	KK 31-B	2	3	3,5	6	2	2	6	2	12	33,5
	"	33	KK 31-C	6	4	3	4	3	1,5	2	5	4	22,5
	"	34	KK 31-D	11	3	2	4	5	2	2	2	2	19
32	"	35	KK 32-A	10	3	6	2	4	1	13	10	2	38
33	"	36	KK 33-A	6	1	8	7	20	9	9	13	10	76
34	"	37	KK 34-A	6	19	8	4	9	10	6	6	8	51
35	"	38	KK 35-A	7	9	4	2	5	12	4	4	4	35

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Koirakano					1	2	3	4	5	6	7	8	Total (2 - 8)
36	"	39	KK 36-A	10	8	5	3	4	3	8	4	6	33
37	"	40	KK 37-A	11	4	8	6	4	3	7	8	5	41
38	"	41	KK 38-A	9	15	4	3	4	2	4	8	6	31
39	"	42	KK 39-A	6	14	8	10	4	8	15	3	4	52
40	"	43	KK 40-A	9	2	9	7	2	18	5	6	2	49
41	"	44	KK 41-A	5	1	3	5	1,5	3	3	6	6	27,5
42	"	45	KK 42-A	9	1	9	1	1	3	1	4	4	23
43	"	46	KK 43-A	10	2	4	11	1	2	5	5	2	30
44	"	47	KK 44-A	4	5	3	4	11	2	3	4	2	29
	"	48	KK 44-B	10	1	2	0	2	4	2	1,5	2	13,5
45	"	49	KK 45-A	8	2	2	2	2	2	5	2	4	19
46	"	50	KK 46-A	7	2	4	3	4	4	4	4	2	25
	"	51	KK 46-B	3	1	4	2	0	0	0	0	4	10
47	"	52	KK 47-A	16	2	23	2	6	3	14	3	10	61
Total		**47**											
Total households			**52**										
Nber of Persons				**349**									
Total (2 - 8)													**1771**
Average generation rate (waste quantity generated per day and capita)													**0,72**

Results of solid waste weighing survey

District : Banda Bari

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Banda-Bari					1	2	3	4	5	6	7	8	Total (2 - 8)
1		1	BD 1-A	9	15	11	14	20	8	9	4	10	76
	"	2	BD 1-B	4	10	21	13	15	18	20	11	10	108
	"	3	BD 1-C	6	12	6	9	10	6	5	11	6	53
	"	4	BD 1-D	2	11,5	12	15	12	13	17	9	9	87
2	"	5	BD 2-A	13	6	3	8	2	4	3	9	4	33
	"	6	BD 2-B	7	4	6	2	2	4	2	5	5	26
	"	7	BD 2-C	7	7	5	8	10	6	5	4	8	46
	"	8	BD 2-D	6	3	3	4	4	4	3	3	5	26
	"	9	BD 2-E	2	2	4	7	5	5	8	3	4	36
3	"	10	BD 3-A	8	2	4	1	9	4	13	2	10	43
	"	11	BD 3-B	3	1	5	10	1	2	7	5	2	32
4	"	12	BD 4-A	20	11	17	13	7	5	3	5	7	57
5	"	13	BD 5-A	3	5	5	3	3	3	7	3	2	26
	"	14	BD 5-B	4	6	5	1	7	6	4	3	4	30
	"	15	BD 5-C	7	8	2	11	6	1	10	2	6	38
	"	16	BD 5-D	6	8	3	14	1	5	10	3	4	40
	"	17	BD 5-E	4	5	2	10	5	3	6	0	0	26
6	"	18	BD 6-A	6	16	2	6	4	9	10	4	10	45
	"	19	BD 6-B	7	5	5	17	2	4	6	6	8	48
	"	20	BD 6-C	6	5	7	20	5	2	5	3	7	49
	"	21	BD 6-D	5	2	4	7	3	2	5	5	4	30
7	"	22	BD 7-A	4	2	3	2	3	2	3	3	2	18
	"	23	BD 7-B	5	8	2	3	2	4	4	3	3	21
	"	24	BD 7-C	2	4	2	2	3	2	7	2	4	22
	"	25	BD 7-D	3	2	1	3	3	5	3	2	6	23
8	"	26	BD 8-A	5	2	18	8	5	3	3	5	6	48
9	"	27	BD 9-A	8	12	11	18	7	11	12	5	5	69
	"	28	BD 9-B	9	9	7	10	5	3	8	8	9	50
	"	29	BD 9-C	8	2	8	11	11	7	11	7	5	60
10	"	30	BD 10-A	14	20	9	7	11	12	11	6	7	63
11	"	31	BD 11-A	7	16	14	13	4	11	14	7	6	69
	"	32	BD 11-B	7	7	7	15	20	5	9	5	3	64
	"	33	BD 11-C	5	12	4	10	12	3	5	5	7	46
	"	34	BD 11-D	8	15	5	5	6	4	10	10	6	46
12	"	35	BD 12-A	13	28	13	10	9	10	14	11	8	75
13	"	36	BD 13-A	5	4	7	6	7	6	9	7	5	47
14	"	37	BD 14-A	8	14	8	5	5	8	9	6	8	49
15	"	38	BD 15-A	2	4	6	3	5	6	4	2	9	35
	"	39	BD 15-B	5	14	11	6	4	7	4	4	7	43

N°	District	N°	Household	Nbr of Persons	Quantity of solid waste								
Banda-Bari					**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total (2 - 8)**
16	"	40	BD 16-A	11	4	9	8	12	6	10	9	10	64
	"	41	BD 16-B	2	1	1	3	2	3	1	4	1	15
17	"	42	BD 17-A	5	6	10	10	6	10	5	16	6	63
18	"	43	BD 18-A	9	18	7	6	6	8	7	10	10	54
19	"	44	BD 19-A	13	6	5	4	6	17	4	4	5	45
20	"	45	BD 20-A	7	2	0,5	5	4	6	2	5	3	25,5
	"	46	BD 20-B	5	2	1	1	2	3	4	1	2	14
21	"	47	BD 21-A	6	8	4	3	7	5	1	4	10	34
	"	48	BD 21-B	5	4	3	6	5	6	1	7	6	34
22	"	49	BD 22-A	15	12	5	3	13	10	5	2	7	45
23		50	BD 23-A	10	16	9	5	15	13	13	11	9	75
24	"	51	BD 24-A	5	3	7	6	6	5	5	6	5	40
	"	52	BD 24-B	6	18	11	5	9	11	8	7	7	58
25	"	53	BD 25-A	8	2	5	6	4	9	5	5	4	38
	"	54	BD 25-B	6	5	7	8	9	2	7	3	6	42
Total		**25**											
Total households			**54**										
Nber of Persons				**366**									
Total (2 - 8)													**2449,5**
Average generation rate (waste quantity generated per day and capita)													**0,95**

C.6 PILOT STUDY FACILITY CONSTRUCTION

TERMS OF REFERENCE (TOR)

1.General

1.1 All measurement in the Pilot Project shall be recorded in metric units.

1.2 The Contractor is responsible for design, construction, trial run / test run, Operation and Maintenance (O&M) and Sampling water quality testing and evaluation.

1.3 Any other Terms of Reference (TOR) required shall be discussed by the Client and the Contractor.

1.4 The Contractor shall submit the following reports before the commencement of the contract.

1) Personnel data for Engineers
2) Procedure for design of the Pilot Project
3) Work Schedule for the Project

1.5 The Size of Drawings and Reports.

1) The result of Pilot Project shall be designed by the Contractor on the A1 sizes and A4 sizes.

2. Detailed Description of Pilot Project

2.1 Designing the Two Pilot Plants

Process Treatment	Daily Average Design Flow (m^3/day)	Remarks
UASB + Eco-Engineering	100	
"Jyokaso" + Eco-Engineering	10	

Scope of Engineering will be process design, basic and detailed engineering including preparation of drawing for construction of civil units, mechanical fabrication drawings, piping and electrical drawings, preparation of technical specification and bill of materiel.

2.2 Construction of Two Pilot Plants

UASB PLANT (UASB + TRICKLIN FILTER): Capacity 100 meter cube per day

Sr.N°	Unit	Field Wise Item		
		Civil/Architectural Works	Electrical Works	Mechanical Works
A.	UASB Reactor			
1.	Inlet Works	O		
2.	Screen & pump pit & pump	O	O	O
3.	Grit chamber	O	O	O
4.	UASB reactor (H: 4M; Area 20M^2: height of gas collector 1.4 M above UASB wall			
5	Sludge sump			O
B.	Trickling Filter			
1.	Wall structure (3.2M dia.X 2.5M) +Rotating arm + media & grating	O	O	O
2.	Effluent collection pit (settling tank + chlorination chamber)	O		O
C.	Electrical Items			
1.	Motor control centre for all drives (located in MCC room in the		O	
2.	building)		O	
3.	Plants lighting		O	
D.	Mechanical Items			
1.	Bar screen (coarse & fine)			O
2.	Inlet pump			O
3.	Drain pump			O
4.	Sludge pump			O
5.	Sprinkler system with motor arrangement (for Boitower)			O
E.	Gas system			
1.	Gas holder			O
2.	Flaring system & gas flow meter			O
F.	Office & Lab			
1.	Office & laboratory building – 50mt (including MCC room & toilet block)	O		
2.	Repair tools (Maintenance spares)	O		

3.	Chemicals (powder chlorine equivalent)	O		
G.	STP utilities & Upport	O		
1.	Equipment for removal screenings	O		
2.	Grit and sludge	O		
3.	Tube well and water supply system	O		
4.	Drainage system	O		
5.	Fire fighting equipment	O		
6.	Roads & pavement	O		
7.	Sites developments	O		
8.	Display board	O		
9.	Office furniture equipment			
H.	Eco-Engineering			
1.	Pond (3mX3mX2m)	O		
2.	Stream (50mX1mX2m)	O		
I.	Operation and Maintenance			
1.	Manual Preparation, start-up	O		
2.	Monitoring, O& M training for 6 months	O		
	Total (A+B+C+D+E+F+G+H+I)			

JYOKASO PLANT

Sedimentation / Separation – Contact Aeration Process + Eco-Engineering Method)

Unit	Field Wise	
	Civil	E & M
1. Earth Work	O	
2. Foundation Work	O	
3. Iron Bar/Frame Work	O	
4. Bank Tilling	O	
5. Piping Work		O
6. Electric Work		O
7. Installation of Jyokaso	O	
8. Installation of equipment		O
9. Operations Rooms		
10. Test Run / Trial Run	O	
11. Eco-Engineering "Shimanto" Method	O	
12. Operation& Maintenance Manual Operation, and	O	
Start Up, Monitoring, O&M and Training for 6 months	O	

2.3 Evaluation of Two Treatment Process

(1) UASB Method

- Evaluation for the Treated Water Quality.
- Bio-gas Generation
- Withdraw Sludge Performance
- OJT & Technology Transfer (T/T)

(2) Jyokaso Method

- Evaluation for the Treated Water Quality.
- Bio-gas Generation
- Withdraw Sludge Performance
- OJT & Technology Transfer (T/T)

2.4 Water Quality Test

The water quality test to judge the treatment effectiveness of Pilot Plants includes the following:

(1) Water quality test items on the site
In water quality test on the site, it is essential that respective items can be easily measured and results obtained smoothly. The test results are important, because measures and methods for operation/maintenance will be based on such results. Water quality test items on the site for unit equipments are shown in the following table:

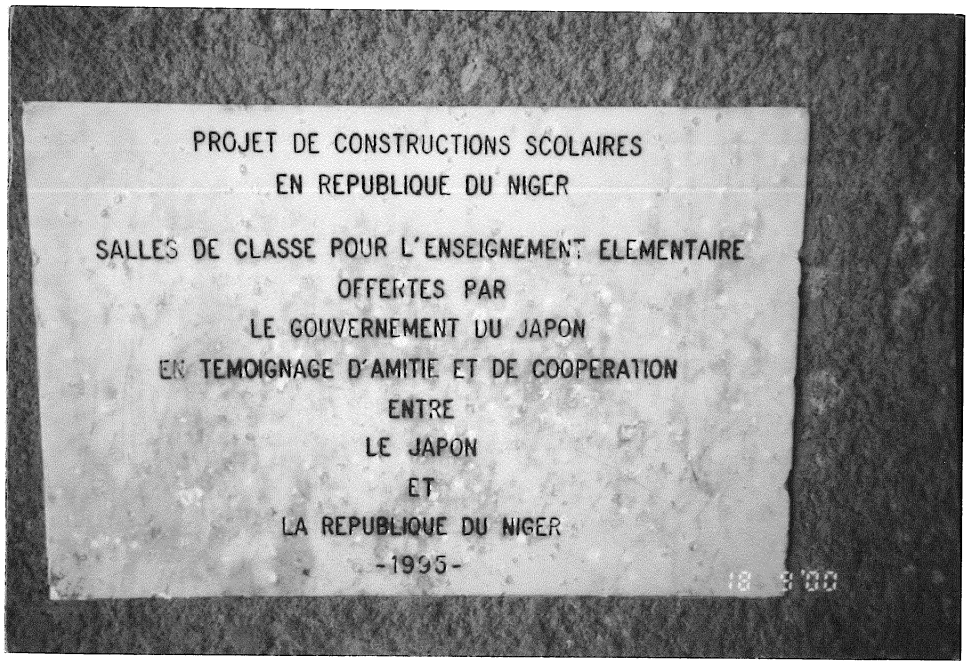
table 1. Water quality test items on the site

Unit equipments	Colour	Odor	Water temperature	PH	Transparency	DO	Residential chlorine
Sedimentation/separation or UASB reactor	O	O	O	O	O	-	-
Trickling Filter	O	O	-	O	O	-	-
Contact aeration tank	O	O	O	O	O	O	-
Sedimentation tank	O	O	-	O	O	-	-
Disinfection tank	O	O	-	-	-	-	O

(2) Water quality test items that need to be analysed in a laboratory

Items that cannot be measured on the site and need to be analysed in the laboratory includes SS, BOD, COD, NH_4-N, NO_x-N, (or NO_3-N), PO_4-P, and /or fecal coliforms. As for total coloforms and/or fecal coliforms, use the disinfection tank as a sample For other items, however, use the effluent from sedimentation tank. It is desirable to analyse the effluent from each unit equipment, if possible, though this requires many samples and is costly. Therefore, at least the final effluent should be analysed.

APPENDIX D: PHOTOGRAPH



Gountou Yena River near City Hall

Waste dumped around Gaountou Yena River

Waste dumped near road crossing of Gountry Yena River

Public toilet

Gountou Yena River(Upper stream)

Gountou Yena River

Waste Container

River basin

Increase river flow due to rain

Gountry Yena River

Flood due to heavy rain

Intake weir at Goudel Water Treatment Plant