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GOVERNMENT OF THE DEMOCRATIC
SOCIALIST REPUBLIC OF SRI LANKA

MINISTRY OF HOUSING, CONSTRUCTION AND
PUBLIC UTILITIES

TERMS OF REFERENCE FOR A FEASIBILITY STUDY ON GREATER KANDY AND NUWARA ELIYA WATER SUPPLY AND ENVIRONMENTAL IMPROVEMENT PLAN

National Water Supply & Drainage Board

Galle Road

Ratmalana

Sri Lanka

September 1996

Standard Model of Terms of Reference

Application for the
Technical Cooperation (Development Study)
by the Government of Japan

1. Project Digest

(i) Project Title – Feasibility Study on Greater Kandy & Nuwara Eliya Water Supply and Environmental Improvement Plan

(ii) Location – Kandy & Nuwara Eliya

(iii) Implementing Agency – National Water Supply & Drainage Board in Association with Sri Lanka Land Reclamation & Development Corporation.

(a) Water Supply & Sewerage

- Name of the Agency: National Water Supply & Drainage Board

- Number of the Staff of the Agency (on a category basis)

Professional	–	400
Executive & Clerical	–	1500
Skilled	–	1600
Unskilled	–	4000

- Budget Allocated to the Agency: Rs. 4000 Million per year

- Organization Chart: (Attached)

(b) Rehabilitation of Lakes

Name of Agency : Sri Lanka Land Reclamation & Development Corporation.

Number of the Staff of the Agency (on a category basis)

Executive Engineers	54
Executive Accountant	09
Ex. Admn. & Others	62
Supervisor - Technical	41
Supervisor - Non Technical	57
Clerical & Allied	249
Manual Per-Skilled	209
Unskilled	257

Budget allocated to the Agency : Rs. 500 Million

Organisation Chart (attached)

(iv) Justification of the Project

Current Situation of the Sector

The NWS&DB is a public authority established under the National Water Supply & Drainage Board Law No. 2 of 1974 of the National State Assembly, and now is an autonomous body under the Ministry of Housing, Construction and Public Utilities. The NWS&DB has its main responsibilities in developing, providing, operating and controlling public water supply facilities to distribute water for public, domestic or non-domestic including industrial and commercial purposes and to charge for the water so supplied.

NWSDB is the principal organization responsible for water supply and sanitation in Sri Lanka. The NWSDB operates through five Regional Support Centres (RSCs), the Central RSC, Greater Colombo RSC, North Eastern RSC, Southern RSC and Western RSC.

The 248 schemes under purview of the NWS&DB have produced 310 million m3 of water in 1993. The total number of connections under these schemes was 260,996. A population of 2.1 million had received 24 hours water supply while 3.2 million were benefitted with a service less than 24 hours.

Of the total population, 68.8 percent in the urban area and 34.4 percent in the rural area has drinking water primarily from safe sources. The key facts and figures are summarized in Table-1.

Table 1 Number of Water Supply Schemes in Sri Lanka

Year	Total Schemes	NWS&DB Maintained Schemes	% of NWS&DB Schemes
1991	476	231	48.5
1992	491	245	49.8
1993	494	248	50.2

The main objective of the Sri Lanka Land Reclamation & Development Corporation is reclamation and development of land whilst ensuring a Lying areas) Reclamation & Development Board by Act No. 15 of 1968, flood reehabituate and improving the environment by rehabilitating, creating and maintaining pollution free inland water bodies engaging in engineering services and creation of new buildable lands.

Action was taken in 1968 by the formulation of the Colombo District Low Lying Reclamation Board. This was subsequently amended by Act Nos. 27 of 1976 and 52 and 76 of 1982 which expanded the scope of the Corporation.

The Sri Lanka Land Reclamation & Development Corporation works within the ambit of the above Acts. Its primary activities are as follows.

(a) Reclaims and the Develops marshy and low lying areas declared under Section 2 of the Corporation Act and renders them suitable for Building, Commercial or Agricultural purposes.

(b) Retains the custody, management and control of such land vested with the Corporation pending such reclamation and development.

Greater Kandy

The on-going trend in new human settlements within the Kandy Municipal Council (KMC) limits will gradually slow-down due to the constraint in land availability. New settlements within KMC limits will perhaps come to a halt by the year 2,000. Already, new human settlements are taking place on a large - scale around the out-skirts of the KMC. This trend will increase after the year 2,000. The concept of "Greater Kandy" was mooted to facilitate the basic amenities to these human settlements taking place in the out-skirts of the KMC.

At present, the water supply coverage within the KMC is about 90%, while that in the out-skirts is only 25%. For KMC alone, the water demand in another 25 years will be (15 MGD) almost twice the production capacity of the water treatment plant, currently supplying water to KMC. In the same period, the water demand for the area within the Greater Kandy area outside the KMC limits will be about 3 1/2 times the current KMC plant capacity. In all, the total water demand of the Greater Kandy area in another 25 years will be about 5 1/2 times the current KMC plant capacity (about 180,000 m3/day or 40 MGD).

The areas to be covered by the study are listed below.

a. Kandy Municipal Council
b. Kandy Four Gravets - Part
c. Harispattuwa - Part
d. Akurana - Part
e. Pujapitiya - Part
f. Patha Dumbara - Part
g. Udunuwara - Part
h. Yatinuwara - Part
i. Kundasale - Part
j. Patha Hewaheta - A Small Part

It is obvious from the above that there will be a pressing need for drinking water in the Greater Kandy area. Hence the project is justified and a study is essential.

At present, there is no formal excreta/wastewater & solid waste disposal within the Kandy Municipal area and highly populated surroundings. This has contributed to an insanitary condition in the area with serious impairment of public health. With the increase of the water supply in the Greater Kandy area, this situation will deteriorate still further hence a strategy is needed to rectify the situation.

Further leachate from waste water systems & solid waste dumps pollute the existing water supply source feeding the Greater Kandy Area, which is the Mahaweli River.

In addition to improvement of water supply and sewerage facilities, it is necessary to carry out rehabilitation works to improve environment in Greater Kandy area to create pollution free water bodies. These measures are needed due to effluent discharges into Kandy Lake.

Nuwara Eliya

It has been estimated that there will be an additional water demand beyond the year 1995 in the Nuwara-Eliya city, mainly due to additional population resulting from foreign and local tourist who visit Nuwara Eliya city and the increasing population due to rapid urbanization.

As the existing source and the supply facilities are not adequate to provide for this additional demand, it is proposed to augment the existing scheme by developing a new source with a treatment plant. Implementing this project will benefit the tourist industry to a great extent. It will also benefit the residents of the Nuwara-Eliya city by ensuring an uninterrupted water supply throughout the year.

Nuwara-Eliya town does not have a Central Sewage Treatment facility. All Institutions and households are connected to individual septic tanks. However, this is not a satisfactory arrangement as the population density in the Nuwara-Eliya Town Area is extremely high. There are many Tourist Hotels also in this area. In fact the overflowing sewage has now become a health hazard. Therefore, it has become necessary to construct a central waste water treatment plant to treat the sewage emanating from the area at a location away from the city centre.

Apart from improving water supply and sewerage facilities. It is necessary to carry out rehabilitation works in Nuwara Eliya Municipal Council area to improve water bodies to creater pollution free water bodies. Nuwara Eliya Lake is polluted and silted by effluent discharged into the lake. With the increase of urbanization, discharges tend to increase.

There is a need to plan and implement a scheme to rehabilitate the water bodies and have a control on discharge of effluent and minimise siltation.

(v) Desirable or scheduled time of the commencement of the Project

- As early as possible

(vi) Expected funding source and/or assistance (including external origin)

- Japanese Government

(vii) Other relevant Projects, if any

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2. Terms of Reference of the Proposed Study

(i) Necessity/Justification of the Study

- Current status of water supply and environmental conditions justify the study

(ii) Necessity/Justification of the Japanese Technical Cooperation

- Since JTC offers assistance for development studies for projects that could be implemented by the GOSL.

(iii) Objectives of the Study

To ensure an adequate water supply and sanitation and improvement of environment with respect to quantity and quality to the Kandy and Nuwara Eliya city throughout the year.

(iv) Area to be covered by the study

Greater Kandy and Nuwara-Eliya city and the surrounding highly populated areas.

(v) Scope of the Study

1. Water Supply

To provide sufficient quantities of acceptable quality pipe borne water to project area which will include identification, investigation of all available sources and carrying out a feasibility study and basic design for the selected alternative.

2. Sewerage

To provide an environmentally acceptable piped sewerage collection and disposal systems for Kandy Municipaliaty and Nuwara Eliya Municipality which will include study of all alternatives for sewerage collection and disposal systems and carrying out a feasibility study and basic designs for the selected alternative.

3. Rehabilitation of Lakes

To formulate a plan for rehabilitation of lakes especially Kandy Lake and Nuwara Eliya Lake in order to make a pollution free environment. The plan will include the identification of point sources of pollution and formulation of remedial measures to overcome future pollution of these water bodies.

(vi) Study Schedule

Study should be started at the earliest possible date and about 12 months period will be required for the study.

(vii) Expected Major Outputs of the Study

Water Supply :

A comprehensive Feasibility Report on the most desirable option for a new source including the basic designs for the new water supply system.

Environmental Conditions

Several study options for an effective and efficient sewerage scheme with feasibility study and a cost comparison of these options in order to select the most appropriate solution. Prepare basic designs for sewerage collection system and treatment plant and also to prepare rehabilitation works needed to improve the water bodies in the Greater Kandy and Nuwara Eliya Municipal Council areas.

(viii) Request of the study to other Donor Agencies

None

(ix) Other relevant information

Information pertaining to existing water supply scheme in Kandy and Nuwara-Eliya City.

3. Facilities and Information for the Study Team, etc.

(i) Assignment of counterpart personnel of the implementing agency for the Study (Number, academic background, etc.)

Required personnel will be assigned to the Study Team

(ii) Information on the security conditions in the Study Area

Security condition is satisfactory.

4. Global Issues (Environment, Women in Development, Poverty, etc.)

(i) Environmental management, forestry, biodiversity of the Project, if any

Issues related to ground water and forest.

(ii) Anticipated environmental impacts (both natural and social) by the Project, if any

EIA is to be carried out along with the Study.

(iii) Project components which require special consideration for women(such as gender difference, women specific role, women's participation), if any

--

(iv) Anticipated impacts on women caused by the Project, if any

Women will save their time which is spent on water collection.

(vi) Proverty reduction components of the Project, if any

--

(vii) Any constraints against the low income people caused by the Project

--

5. Undertakings of the Government of (the recipient country)

In order to facilitate a smooth and efficient conduct of the Study, the Government of (the recipient country) shall take necessary measures :

(i) to secure the safety of the Study Team

(ii) to permit the members of the Study Team to enter, leave and sojourn in (the recipient country) in connection with their assignment therein, and exempt them from alien registration requirement and consular fees.

(iii) to exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of (the recipient country) for the conduct of the Study.

(iv) to exempt the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study.

(v) to provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced in (the recipient country) for Japan in connection with the implementation of the Study.

(vi) to secure permission or entry into private properties or restricted areas for the conduct of the Study.

(vii) to secure permission for the Study to take all data, documents and necessary materials related to the Study out of (the recipient country) to Japan.

(viii) to provide medical services as needed. Its expenses will be chargeable to members of the Study Team.

The Government will provide most of the things listed (i) to (viii).

6. The Government of (the recipient country) shall bear claims, if any arises against member(s) of the Japanese Study Team resulting from, occurring in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the member of the Study Team.

- GOSL is to agree.

7. (The implementing agency) shall act as counterpart agency to the Japanese Study Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

NWSDB is responsible for this.

The Government of (the recipient country) assured that the matters referred in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.

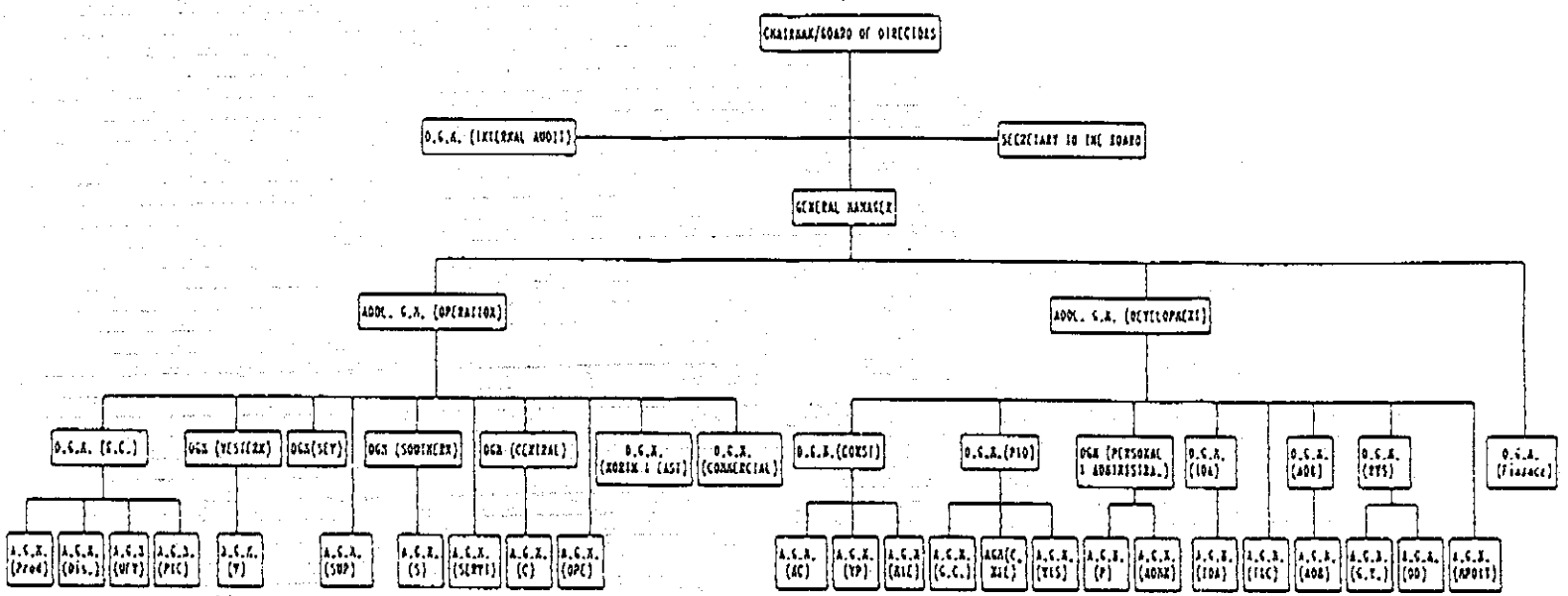
Signed : 

Title : ...

on behalf of the Government of Sri Lanka : General Manager

Date : 17-09-96

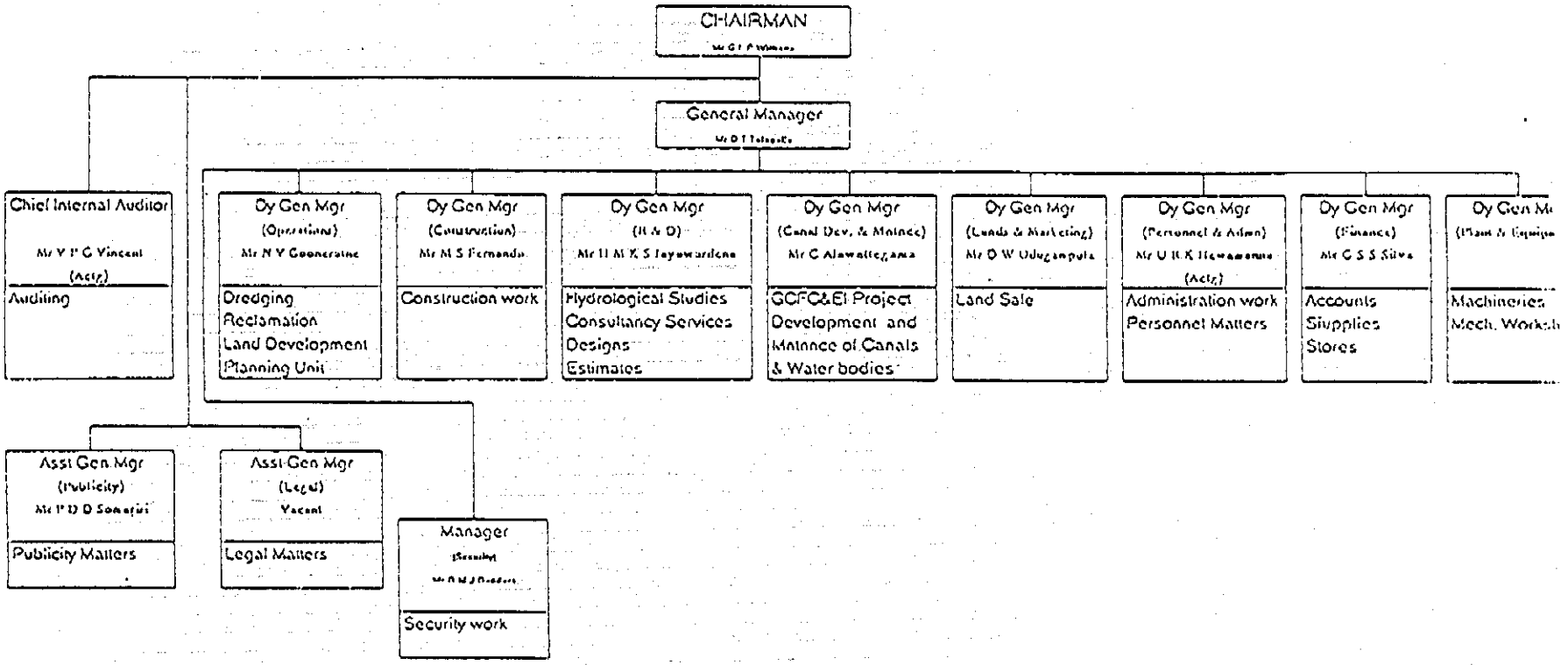
ORGANIZATION STRUCTURE OF NWSDB

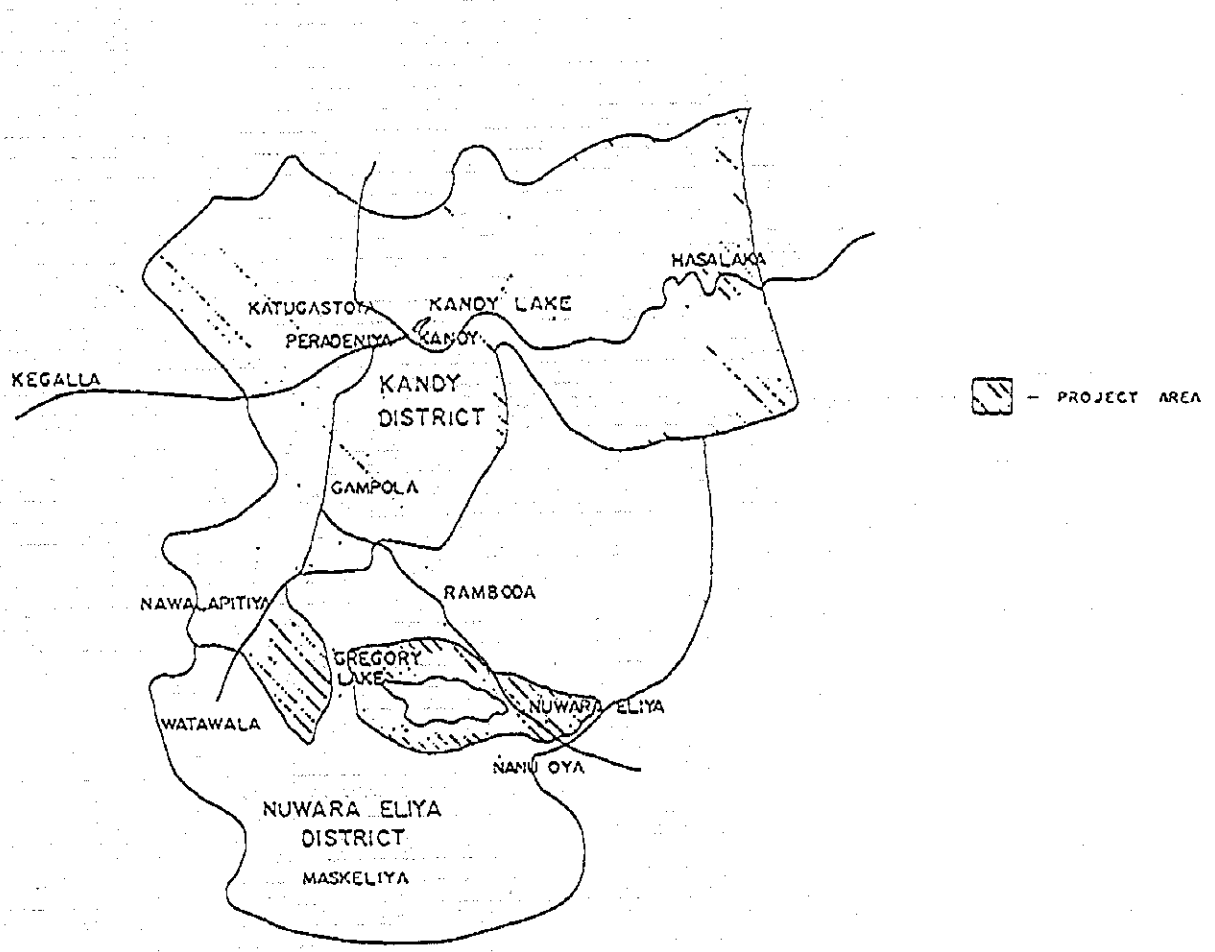


ADDL G.M.	-	Additional General Manager	APDIT	-	Manpower Development & Training
D.G.M.	-	Deputy General Manager	OD	-	District Development
A.G.M.	-	Assistant General Manager	IDA	-	International Development Agency
S.C.	-	Greater Colombo	Dis	-	Distribution
W	-	Western	P	-	Personnel
SEW	-	Sewerage	C	-	Central
SUP	-	Supplies	C,NIC	-	Central, North Central
S	-	Southern	WSS	-	Western and Southern
Prod	-	Production			
P&D	-	Planning & Designs			
SERVI	-	Services			
WFV	-	Unaccounted for Water			
PIC	-	Planning & Co-ordination			
ADB	-	Asian Development Bank			
ADMN	-	Administration			
T&C	-	Tender & Contracts			
S.T.	-	Ground Water			
Oper	-	Operations			
MC	-	Major Construction			
TP	-	Construction in Western Province			

ANNEXURE - A

SRI LANKA LAND RECLAMATION AND DEVELOPMENT CORPORATION
ORGANISATIONAL STRUCTURE





GREATER KANDY AND NUWARA ELIYA WATER SUPPLY

AND ENVIRONMENTAL IMPROVEMENT PLAN

2．質問表（QUESTIONNAIRES）

QUESTIONNAIRE
FOR GREATER KANDY AND NUWARA ELIYA WATER SUPPLY AND ENVIRONMENTAL IMPROVEMENT PLAN

A. General

1. Land use maps for the study areas

2. Population
   Latest population and population growth rate for the proposed study areas defined in the terms of reference. (Total population, seasonal population (tourists etc.) and breakdown according to the municipal boundaries)
   Please provide the latest population census data if available.

B. Water Supply Systems

1. Existing water supply facilities (intakes, water purification plant, pump station, pipelines etc.)

   a. Specifications for existing water supply facilities
      1) Drawings
         - General location map
         - General plan for each facility
         - Flow sheet for water purification plant
      2) Specifications for each facility

   b. Served population
      (Total and breakdown according to water supply schemes)

   c. Water production (Total and breakdown according to water supply schemes)
      The amount of water supplied (produced) for the past 5 years.

   d. Water quality
      Raw water and product water quality for each scheme)

   e. Breakdown of water consumption for each scheme

Household	m3/ Day
Industry	
Service(Hotel, Restaurant, etc.)	
Public Service(Hydrant etc.)	
Others	
Leakage/unaccounted-for water	
Total	m3/ Day

   f. Existing facilities which require rehabilitation works

   g. For Greater Kandy water supply
      Latest development plan for water supply system. Please specify if there is any change

from the existing master plan(1994).

h. For Nuwara Eliya water supply
Please describe ADB funded water supply project and its present progress.

C. Sanitation and Drainage System

1. Existing sanitation and drainage system

a. Drawings
- Existing drainage system (including drainage pipes and ditches etc.)
- Location map of public toilets and other public sanitation facilities

b. Night soil and septage collection and disposal system

c. Industrial waste water (including tourism (hotels etc.))
Please provide information on major sources.
- Source
- Waste water amount (m^3/day)
- Type of treatment
- Discharge point
- Discharged waste water quality

2. For Greater Kandy sewerage system development
Please provide an identification report for Kandy sewerage system development

3. For Nuwara Eliya
Please describe the following projects
- Storm water drainage project by UDA
- Cleaning and dredging of lake Gregory by SLRDC

D. Environment Protection

1. Law / Act / Regulation

a. Water pollution control and prevention
b. Groundwater pollution control and protection
c. Comprehensive water pollution control
d. Environmental quality standards for water
e. Waste disposal standards
- Wastewater
- Sludge / Soil waste

f. Environmental Impact Assessment (EIA)
- System
- Legal procedure
- Resettlement policy with execution plan
- Location of environmental vulnerable area such as wetland/shallow lake

g. National environmental action plan (latest)

2. Authority / Organization
   a. Responsible authority at the central government
   b. Authority in charge of planning
   c. Responsible authority at the local level
   d. Water analysis laboratories
   e. Budget and expenditure for the environmental protection

3. Environmental Screening
   Please fill out attached screening forms according to the terms of reference.
   Please prepare separate forms for Greater Kandy and Nuwara Eliya.

E. Institution/Business Management

1. Ogranizational setup

   a. Who (which organization) is/are responsible for water supply and sanitation in peripheral pradeshiya sabhas in Greater Kandy area? NWSDB? Kandy Municipal Council (MC)? Divisional Secretaries (DS)? Pradeshiya Sabhas (PS)? or else?

   b. Who is responsible for water supply and sanitation in Kandy City?

   c. Who is responsible for water supply and sanitation in Nuwara Eliya City?

   d. Who is implementing and maintaining the coming Greater Kandy project?

   e. Who is implementing and maintaining the coming Nuwara Eliya project?

   f. Are individual water supply and sanitation schemes run financially autonomously?

   Please provide laws and regulations justifying answers to the above questions accompanied by the present organizational charts and list of personnel of the relevant organizations.

2. Tariff/Revenue

   a. Kindly provide the NWSDB's tariff tables of the past and the present (1975 to date).

   b. Kindly provide tariff tables of the related PS's, DS's and MC's of the past and present.

   c. Kindly provide records of revenues (back 10 years) of the individual schemes within the Greater Kandy, Nuwara Eliya and the entire NWSDB broken down to categories of water users. Also indicate revenues other than water charges, e.g., government subsidy.

3. Cost/Expenditure

   a. Kindly provide records of costs (back 10 years) of the individual schemes within the Greater Kandy, Nuwara Eliya and the entire NWSDB broken down to major expenditure items such as personnel, fuel and power, chemicals and material, depreciation, reserve for future expansion, etc.

4. Operation/Business

a. Kindly provide financial statements (profit and loss, balance sheet, project account - back 10 years) of the individual schemes within the Greater Kandy, Nuwara Eliya and the entire NWSDB.

b. How and by whom is a new tariff table approved?

c. It is understood that many proposals and recommendations to improve financial position of NWSDB were made by many agencies. Who is in charge to adopt one or others? Is he fully authorized or delegated to do this? Is there any problem in doing this?

Environmental Screening Form for Greater Kandy / Nuwara Eliya water supply projects

Items for Environmental Screening			Description	Evaluation*1	Remarks (reasons)
Socio-Economic Environ-ment	1	Resettlement	Resettlement required for land acquisition	Y/N/U	
	2	Economic activities	Alternation of economic structure and loss of production capacity of land etc..	Y/N/U	
	3	Traffic and public facilities	Traffic disturbance and impact on access to schools and hospitals	Y/N/U	
	4	Division of community	Division of community by traffic disturbance	Y/N/U	
	5	Historical assets and cultural properties	Loss and/or degradation of shrines, temples and buried cultural properties	Y/N/U	
	6	Water and common rights	Violation of water, common and fishery rights	Y/N/U	
	7	Sanitation	Degradation of sanitary condition by wastes and parasites	Y/N/U	
	8	Solid waste	Generation of construction wastes, sludge and other solid wastes	Y/N/U	
	9	Disaster (risk)	Increase of risk by landslide, falling rocks and accident	Y/N/U	
Natural Environ-ment	10	Topography and geology	Damage to valued topography and geology by excavation and land fill	Y/N/U	
	11	Soil erosion	Soil erosion by rain after land development and deforestation	Y/N/U	
	12	Ground water	Drying-up of wells by pumping-up for excavation works and pollution by leachate	Y/N/U	
	13	Lake and river basin	Change of hydrological regime and river bed by land reclamation and drainage	Y/N/U	
	14	Coast and sea	Coast erosion and sand accumulation by land reclamation and change of ocean current	Y/N/U	
	15	Wild life (fauna, flora)	Damage for proliferation and extinction of species by habitat distruction	Y/N/U	
	16	Climate	Change of temperature and wind by large scale land development and structure	Y/N/U	
	17	Landscape	Topographic change by land development and distraction of harmonious landscape by structures	Y/N/U	
Environ-mental pollution	18	Air pollution	Pollution by exhaust fumes from cars and factories and harmful gas	Y/N/U	
	19	Water pollution	Pollution by waste water and sludge from water purification plant	Y/N/U	
	20	Soil contamination	Pollution by waste water and harmful substances	Y/N/U	
	21	Noise and vibration	Noise and vibration by traffic and water purification plant operation	Y/N/U	
	22	Land subsidence	Land subsidence by change of land shape and lowering of grand water table	Y/N/U	
	23	Offensive odor	Generation of offensive odor and exhaust fumes	Y/N/U	
Overall evaluation : Necessity for implementation of IEE and/or EIA				Y/N	

*1 Y: Yes
N: No
U: Unknown

Environmental Screening Form for Greater Kandy / Nuwara Eliya sewerage projects

Items for Environmental Screening			Description	Evaluation*1	Remarks (reasons)
Socio-Economic Environ-ment	1	Resettlement	Resettlement required for land acquisition	Y / N / U	
	2	Economic activities	Alternation of economic structure and loss of production capacity of land etc..	Y / N / U	
	3	Traffic and public facilities	Traffic disturbance and impact on access to schools and hospitals	Y / N / U	
	4	Division of community	Division of community by traffic disturbance	Y / N / U	
	5	Historical assets and cultural properties	Loss and/or degradation of shrines, temples and buried cultural properties	Y / N / U	
	6	Water and common rights	Violation of water, common and fishery rights	Y / N / U	
	7	Sanitation	Degradation of sanitary condition by wastes and parasites	Y / N / U	
	8	Solid waste	Generation of construction wastes, sludge and other solid wastes	Y / N / U	
	9	Disaster (risk)	Increase of risk by landslide, falling rocks and accident	Y / N / U	
Natural Environ-ment	10	Topography and geology	Damage to valued topography and geology by excavation and land fill	Y / N / U	
	11	Soil erosion	Soil erosion by rain after land development and deforestation	Y / N / U	
	12	Ground water	Drying-up of wells by pumping-up for excavation works and pollution by leachate	Y / N / U	
	13	Lake and river basin	Change of hydrological regime and river bed by land reclamation and drainage	Y / N / U	
	14	Coast and sea	Coast erosion and sand accumulation by land reclamation and change of ocean current	Y / N / U	
	15	Wild life (fauna, flora)	Damage for proliferation and extinction of species by habitat distraction	Y / N / U	
	16	Climate	Change of temperature and wind by large scale land development and structure	Y / N / U	
	17	Landscape	Topographic change by land development and distraction of harmonious landscape by structures	Y / N / U	
Environ-mental pollution	18	Air pollution	Pollution by exhaust fumes from cars and factories and harmful gas	Y / N / U	
	19	Water pollution	Pollution by eroded soil and industrial waste water etc.	Y / N / U	
	20	Soil contamination	Pollution by waste water and harmful substances	Y / N / U	
	21	Noise and vibration	Noise and vibration by traffic and treatment plant operation	Y / N / U	
	22	Land subsidence	Land subsidence by change of land shape and lowering of grand water table	Y / N / U	
	23	Offensive odor	Generation of offensive odor in sewage treatment plant	Y / N / U	
Overall evaluation : Necessity for implementation of IEE and/or EIA				Y / N	

*1 Y: Yes
N: No
U: Unknown

3. SCOPE OF WORK

THE SCOPE OF WORK
FOR
THE STUDY
ON
GREATER KANDY AND NUWARA ELIYA WATER SUPPLY
AND
ENVIRONMENTAL IMPROVEMENT PLAN
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
AGREED UPON BETWEEN
MINISTRY OF HOUSING AND URBAN DEVELOPMENT
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Colombo, October 2nd. 1997

Mr. V. K. Nanayakkara
Secretary
Ministry of Housing and Urban Development

Mr. Yoshiki Omura
Leader
Preparatory Study Team
Japan International Cooperation Agency

Mr. K. B. Sirisena
Chief Secretary
Central Provincial Council

Mr. J. H. J. Jayamaha
Director
Department of External Resources

Mr. T. B. Madugalle
Chairman
National Water Supply and Drainage Board

I. INTRODUCTION

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Government of Sri Lanka"), the Government of Japan decided to conduct the Study on Greater Kandy and Nuwara Eliya Water Supply and Environmental Improvement Plan in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Sri Lanka.

The present document sets forth the scope of work for the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. To formulate water supply and sewerage master plans up to the target year of 2015
   a. to review and complement the existing Water Supply Master Plan for Greater Kandy
   b. to formulate a master plan for Nuwara Eliya

2. To conduct a feasibility study for the priority project/s identified in the Master Plan, and

3. To pursue technology transfer to the counterpart personnel in the course of the Study.

III. STUDY AREAS

The Study shall cover the Greater Kandy area consisting of:

a. Kandy City
b. a part of Kandy Four Gravets
c. a part of Harispattuwa
d. a part of Akurana
e. a part of Pujapitiya
f. a part of Patha Dumbara
g. a part of Udunuwara
h. a part of Yatinuwara
i. a part of Udapalatha
j. a part of Kundasale, and
k. a small part of Patha Hewaheta;

and Nuwara Eliya City. The Study areas are defined in the Annex-I.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study will cover the following:
(Some items may be dropped, in the case that such are described comprehensively in the existing Water Supply Master Plan for Greater Kandy.)

PHASE I : FORMULATION OF MASTER PLAN

1. Collection and analysis of existing data and information on the water supply and sewerage sector :

- The National Background
  a. Country background
  b. Socio-economic and health indicators
  c. Sector organizations and institutions
  d. Present service coverage and standards
  e. Sector goals
  f. Financial conditions
  g. Involvement of other donor agencies

- The Study area
  h. Natural conditions
  i. Socio-economic and health conditions
  j. Regional development prospects
  k. Existing and future land use
  l. Water resources
  m. Sector organizations and institutions
  n. Management and budget condition of the organizations
  o. Present service coverage and standards
  p. Environment and ecosystem

2. Understanding of the existing services
   a. Existing water supply system and its service level
   b. Existing sanitation, drainage and solid waste services

3. Field surveys and analysis
   a. Preliminary environmental survey
   b. Survey on public consciousness on public health and sanitation
   c. Survey on willingness and affordability to pay
   d. Water and wastewater quality

4. Formulation of Master Plan
   a. Determination of planning framework
   b. Determination of basic policies, goals, targets, and strategies
   c. Identification of the alternatives
   d. Outline design for suggested facilities
   e. Cost estimates
   f. Evaluation of the alternatives
   g. Selection of the best alternative
   h. Organizational and institutional projection
   i. Capacity building program
   j. Financial plan
   k. Staged implementation plan
   l. Identification of the priority project/s

PHASE II: FEASIBILITY STUDY ON THE PRIORITY PROJECT/S

1. Collection and analysis of supplementary data and information on the Project area and beneficiaries

2. Supplementary field survey/s, as necessary

3. Implementation of Feasibility Study
   a. Preliminary design of facilities
   b. Equipment plan
   c. Operation and maintenance plans
   d. Organizational and institutional systems
   e. Tariff, charges and revenue systems for services
   f. Cost estimation
   g. Conduct of Environmental Impact Assessment (EIA)
   h. Comprehensive project evaluation including:
      a) technical aspects (appropriate technology)
      b) financial aspects
      c) social aspects
      d) economic aspects
   i. Implementation plan

V. SCHEDULE OF THE STUDY

The tentative schedule of the Study is shown in the attached sheet of Annex-II.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Sri Lanka:

1. Inception Report:
   Twenty (20) copies at the commencement of the first field survey in Sri Lanka. This report will contain the schedule and methodology of the Study as well as the outline of the field survey.

2. Progress Report (1):
   Twenty (20) copies at the end of first field survey. This report will summarize the findings in the Phase I.

3. Interim Report:
   Twenty (20) copies at the commencement of the second field survey. This report will contain the Master Plan, outline of study program for the Phase II.

4. Progress Report (2):
   Twenty (20) copies at the end of the second field survey. This report will summarize the findings in the Phase II.

5. Draft Final Report:
   Twenty (20) copies within three (3) months after the end of the second field survey. The Sri Lankan side shall submit their comments within one (1) month after the

receipt of the Draft Final Report.

6. Final Report:
Fifty (50) copies within one (1) month after the receipt of the comments of the Sri Lankan side on the Draft Final Report.

VII. UNDERTAKINGS OF THE GOVERNMENT OF SRI LANKA

1. To facilitate the smooth conduct of the Study, the Government of Sri Lanka will take the following necessary measures:

   a. to secure the safety of the Japanese Study team (hereinafter referred to as "the Team").

   b. to permit the members of the Team to enter, leave and sojourn in Sri Lanka for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees.

   c. to exempt the members of the Team from taxes, duties, fees and any other charges on equipment, vehicles, machinery and other materials brought into and out of Sri Lanka for the conduct of the Study.

   d. to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.

   e. to provide necessary facilities to the Team for the remittances as well as the utilization of the funds introduced into Sri Lanka from Japan in connection with the implementation of the Study.

   f. to secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study.

   g. to secure permission for the Team to take all data and documents including photographs and maps related to the Study out of Sri Lanka to Japan.

   h. to provide medical services as needed. It's expenses shall be chargeable to the members of the Team.

2. The Government of Sri Lanka shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Team.

3. National Water Supply and Drainage Board, Kandy and Nuwara Eliya Municipal Councils and Central Provincial Council shall act as counterpart agencies to the Team and also as a coordinating body in relation with other relevant organizations for the smooth implementation of the Study.

4. National Water Supply and Drainage Board, Kandy and Nuwara Eliya Municipal Councils and Central Provincial Council shall, at their own expense, provide the Team with the following, in cooperation with other relevant organizations:

a. Available data and information related to the Study,
b. Additional survey related to the Study, if necessary,
c. Counterpart personnel and supporting staff,
d. Necessary number of vehicles with drivers for the Team
e. Suitable office space with necessary equipment in Kandy, Nuwara Eliya and Colombo, and
f. Credentials or identification cards.

VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, the study team to Sri Lanka,

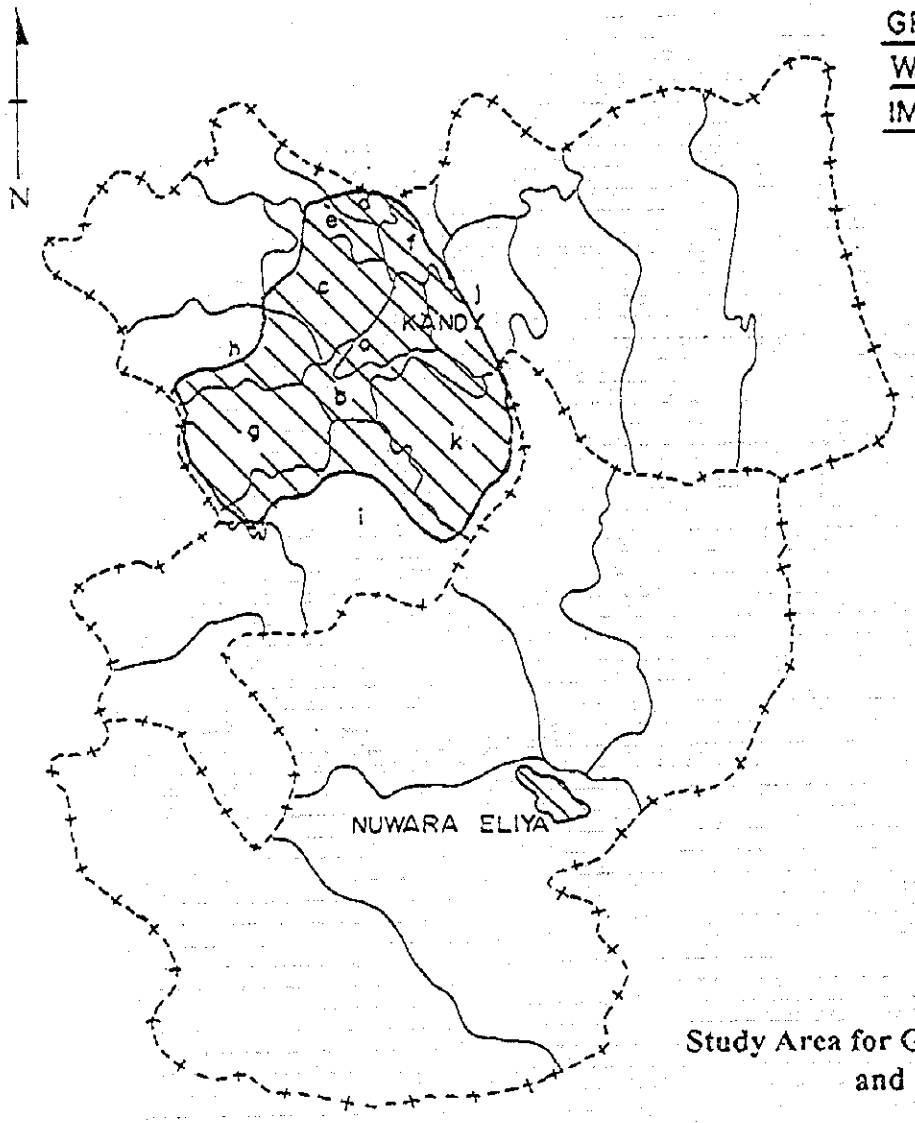
2. to pursue technology transfer to counterparts personnel in the course of the Study.

IX. CONSULTATION

JICA, National Water Supply and Drainage Board, Kandy and Nuwara Eliya Municipal Councils and Central Provincial Council will consult with each other in respect of any matter that may arise from or in connection with the Study.

Annex— I

GREATER KANDY & NUWARA ELIYA WATER SUPPLY & ENVIRONMENTAL IMPROVEMENT PLAN



a. KANDY MUNICIPAL COUNCIL AREA
b. KANDY FOUR GRAVETS PRADESHIYA SABHA
c. HARISPATTUWA PRADESHIYA SABHA
d. AKURANA " "
e. PUJAPITIYA " "
f. PATHA DUMBARA
g. UDUNUWARA
h. YATINUWARA
i UDAPALATHA
j KUNDASALE
k. PATHA HEWAHETA

STUDY AREA

LEGEND

---+— DISTRICT BOUNDARY

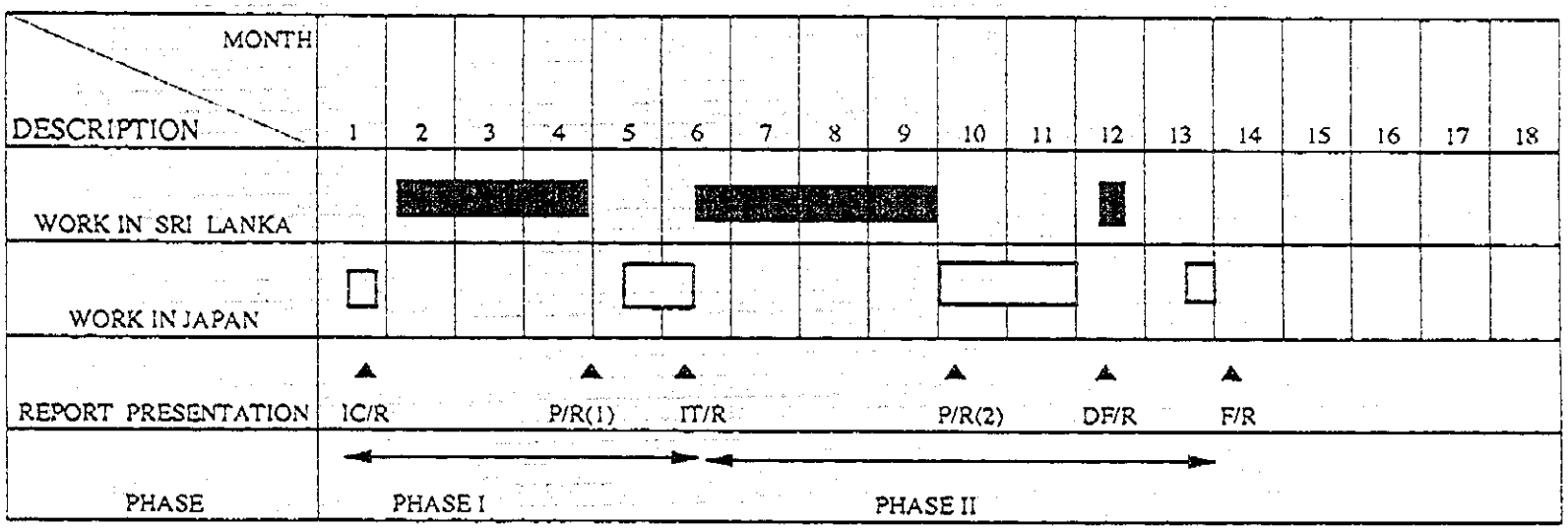
SCALE 1:500000

Study Area for Greater Kandy and Nuwala Eliya Water Supply and Environmental Improvement Plan

ANNEX- II

The Study on
Greater Kandy and Nuwara Eliya
Water Supply and Environmental Improvement Plan
in the Democratic Socialist Republic of Sri Lanka

TENTATIVE SCHEDULE



NOTE
IC/R : Inception Report
P/R : Progress Report
IT/R : Interim Report
DF/R : Draft Final Report
F/R : Final Report

4. MINUTES OF MEETINGS

MINUTES OF MEETINGS
ON
THE SCOPE OF WORK
FOR
THE STUDY
ON
GREATER KANDY AND NUWARA ELIYA WATER SUPPLY
AND
ENVIRONMENTAL IMPROVEMENT PLAN
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
AGREED UPON BETWEEN
MINISTRY OF HOUSING AND URBAN DEVELOPMENT
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Colombo, October 2nd. 1997

Mr. V. K. Namayakkara
Secretary
Ministry of Housing and Urban Development

Mr. Yoshiki Oniura
Leader
Preparatory Study Team
Japan International Cooperation Agency

Mr. K. B. Sirisena
Chief Secretary
Central Provincial Council

Mr. J. H. P. Jayamaha
Director
Department of External Resources

Mr. T. B. Madugalle
Chairman
National Water Supply and Drainage Board

Based on the official request of the Government of the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "the Government of Sri Lanka"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the preparatory study team (hereinafter referred to as "the Preparatory Team") headed by Mr. Yoshiki Omura from 21st September to 4th October, 1997 to discuss the Scope of Work for the Study on Greater Kandy and Nuwara Eliya Water Supply and Environmental Improvement Plan in Sri Lanka (hereinafter referred to as "the Study").

The Preparatory Team had a series of discussions with the Sri Lanka authorities concerned such as Ministry of Housing and Urban Development (hereinafter referred to as "MHUD"), Department of External Resources (hereinafter referred to as "ERD"), National Planning Department (NPD), National Water Supply and Drainage Board (hereinafter referred to as "NWSDB"), Central Provincial Council (hereinafter referred to as "CPC"), Kandy Municipality Council (hereinafter referred to as "KMC"), and Nuwara Eliya Municipality Council (hereinafter referred to as "NEMC"). The list of those who attended these discussions is shown in the Annex. Both sides agreed on the Scope of Work for the Study. In addition, this document sets forth main items discussed and agreed upon.

1. Interpretation of "Environmental Improvement"

Both sides confirmed that "Environmental Improvement" in the name of the Study should be interpreted as "sewerage and sanitation improvement", and that solid waste management and rehabilitation of lakes should not be included.

2. Objectives of the Study

Both sides confirmed that the objectives of the Study should be :

(1) for Greater Kandy

a. to review and complement the existing water supply Master Plan for Greater Kandy.
b. to conduct a water supply Feasibility Study for the priority project areas.
c. to formulate a sewerage and sanitation improvement Master Plan for Kandy Municipality and Peradeniya (including University area).
d. to formulate a sewerage or sanitation improvement Master Plan as appropriate for the towns of Akurana, Katugastota, Madawela, Wattegama, Kundasale New Town, Ampitiya and Talatu Oya.
e. to conduct a sewerage and sanitation improvement Feasibility Study for the priority project areas in Kandy Municipality.

(2) for Nuwara Eliya

a. to formulate a water supply Master Plan and a sewerage or sanitation improvement Master Plan for Nuwara Eliya Municipality.
b. to conduct a water supply Feasibility Study and a sewerage or sanitation improvement Feasibility Study for the priority projects.

3. Target Year

The Sri Lankan side agreed that target year of the Master Plan should be the year 2015.

4. Study Areas

Both sides confirmed that a part of Udapalatha is located in Greater Kandy and should be included in the Study areas.

5. National Steering Committee

The Sri Lanka side agreed to organize a "National Steering Committee" to formulate the basic policy of the Study and to coordinate the concerned Sri Lankan authorities. The Committee will have the following characteristics in order to promote and facilitate cooperation among the authorities:

(1) It shall be presided by the Secretary of MHUD and shall comprise the concerned officers representing such authorities as ERD, NPD, Central Environmental Authority, NWSDB and CPC.

(2) It shall be empowered to make decisions and take responsibilities for the recommendations of the Study.

6. Provincial Coordination Committee

The Sri Lanka side agreed that a "Provincial Coordination committee" should be organized to function at provincial level comprising relevant provincial and divisional authorities in order to facilitate the coordination of activities pertaining to the project chaired by the chief secretary of CPC.

7. Counterpart Personnel

To guarantee the smooth conduct of the Study and promote technology transfer through on-the-job training, Sri Lankan side shall designate the appropriate number of counterpart personnel such as:

1) Leader of the counterpart (part time)
2) Three (3) engineers and two (2) technical assistants (full time)
3) Appropriate number of officers (part time)

8. Office Space and Supporting Staff

The Preparatory Team requested the Sri Lankan side to prepare an appropriate office space (approximately 200m²) for the Study in Kandy Regional Support Center of NWSDB and in Nuwara Eliya respectively. These offices should be equipped with the following:

a) Desks, chairs, and air conditioners
b) Telephone and facsimile with IDD facility
c) Photocopy machine
d) Lighting and electricity supply
e) Peons

The Sri Lankan side accepted the above request. The Preparatory Team explained that the study team would pay the telecommunication fees and the rental fees of facsimile and photocopy machine.

9. Vehicles

The Preparatory Team requested that MHUD would provide three (3) 4WD-vehicles with drivers for the Study. MHUD, however, expressed concern that, due to the budgetary constraints, such a request could not be fulfilled. The Team recognized the situation and agreed to convey the message to JICA headquarters for consideration.

10. Ground Water Investigation

Both sides agreed that the hydrogeological survey (resistivity survey) will be carried out by the study team at JICA's expense and NWSDB will undertake test well boring, pumping test and water quality analysis at NWSDB's expense

11. Counterpart Training

The Sri Lankan side requested for training in Japan of counterpart personnel who are acceptable. The Preparatory Team agreed to convey the request to JICA headquarters.

12. Technology Transfer Seminar

The Sri Lankan side requested for the Preparatory Team to hold seminar/s in the course of the Study. The Preparatory Team agreed to convey the request to the JICA headquarters.

13. Reports

Both sides agreed that the Study reports should be open to the public.

ANNEX

LIST OF PARTICIPANTS

(Sri Lankan side)

Ministry of Housing and Urban Development
- V. K. NANAYAKKARA — Secretary
- C. H. DE TISSERA — Additional Secretary

Central Provincial Council
- K. B. SIRISENA — Chief Secretary

Ministry of Finance, Department of External Resources
- J. H. J. JAYAMAHA — Director

National Planning Department
- S. M. KARUNARATNE — Director

National Water Supply and Drainage Board
- T. B. MADUGALLE — Chairman
- S. B. BOYAGANE — Vice Chairman
- P. M. R. PATHIRAJA — General Manager
- S. WEERARATNE — Additional General Manager (D)
- W. A. KARUNARATNE — Additional General Manager (O)
- P. U. GUNASINGHE — Deputy General Manager (P&D)
- H. G. TILAKARATNE — Deputy General Manager (RSCC)
- M. P. FERNANDO — Deputy General Manager (F)
- S. J. P. WIJEGOONAWARDENE — Assistant General Manager
- R. H. RUVINIS — Chief Engineer
- M. A. S. L. ATTANAYAKE — Manager (CP)
- P. H. S. GAMINI — Chief Engineer

- Heihachiro ISHIHARA — JICA Expert

Kandy Municipal Council
- H. DUNUWILLE — Mayor
- S. D. PIYADASA — Municipal Commissioner
- S. WIJAYARATNE — Chief Works Engineer
- S. EKANAYAKE — Chief Medical Officer of Health

Nuwara Eliya Municipal Council
- A. W. D. B. SENEVIRATNE — Mayor
- L. NEARUBE — Deputy Mayor
- R. B. ABEYSINGHE — Municipal Commissioner
- S. E. JAYARAJAH — Municipal Engineer

Urban Development Authority
- P. SILVA — Director
- S. WIJWRATNE — Deputy Director

(Japanese side)

Preparatory Study Team

Yoshiki OMURA	Leader
Tadashi OUCHI	Water Supply Planning
Ichiro HARADA	Sewerage Planning
Masahiro CHIBA	Study Planning
Terutoshi OZAWA	Water Supply Facility Planning
Koji YOSHINA	Sewerage and Sanitation Facility Planning / Environment
Hiromasa MINAKAMI	Institution / Management

5．収集資料リスト

図　書

	資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
一般（スリランカ国、調査地域）			
1.	Statistical Pocket Book (National - Provincial - District Level), 1995	コピー	Planning & Monitoring Division, Chief Secretary, Central Province
2.	Madhyama Lanka Development Plan, Main Report	コピー	Madhyama Lanka Development Plan Office
3.	Kandy Development Plan 1997 (Draft)	コピー	Central Provincial Office, UDA
4.	Development Plan, Nuwara Eliya 1997	コピー	Urban Development Authority
5.	Resource Profile of Udunuwara A.G.A. Division, Kandy District, 1990	コピー	Regional Development Division, Ministry of Policy Planning and Implementation
6.	Resource Profile of Patha Hewaheta A.G.A. Division, Kandy District, 1990	コピー	Regional Development Division, Ministry of Policy Planning and Implementation
7.	Resouece Profile of Nuwara Eliya A.G.A. Division, Nuwara Eliya District, 1990	コピー	Regional Development Division, Ministry of Policy Planning and Implementation
上水道関連			
1.	Water Supply Master Plan for Greater Kandy - Volume I : Sector Data and Master Plan, 1994	コピー	The National Water Supply & Drainage Board
2.	Water Supply Master Plan for Greater Kandy - Volume II : Appendices and Addendum, 1994	コピー	The National Water Supply & Drainage Board
3.	Water Supply Master Plan for Greater Kandy - Volume III : Environmental Impact Assessment, 1994	コピー	The National Water Supply & Drainage Board
4.	Agreement between NWSDB and the Nuwara Eliya Municipal Council (ADB project)	コピー	The National Water Supply & Drainage Board
5.	Water Supply Sector Project - Feasibility Study, Nuwara Eliya, June 1989	コピー	Sir M MacDonald & Partners
6.	Nuwara Eliya, Water Supply Design Review	コピー	Sir M MacDonald & Partners
下水道・衛生施設関連			
1.	A Manual for the Sri Lanka Public Health Inspector (部分)	コピー	Ministry of Health
2.	Urban Basic Services Project, Final Report for The Canadian International Development Agency, 1997	コピー	UNICEF, Colombo
3.	Pre feasibility report for proposed sewerage scheme for built up areas in Kandy	コピー	The National Water Supply & Drainage Board
4.	Case Study - City's Experience in Wastewater Management	コピー	Municipal Council of
5.	Feasibility Study for the Stormwater Drainage in Nuwara Eliya - Draft Conceptual Plan Report	コピー	Urban Development Authority
6.	17 Towns Development Programme - Progress Report 1996	図書	Urban Development Authority
環境関連			
1.	National Environmental Act, No.47 of 1980	コピー	The Democratic Socialist Republic of Sri Lanka
2.	National Environmental (Amendment)Act, No.56 of 1988	コピー	The Democratic Socialist Republic of Sri Lanka

	資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
3.	Gazette Extraordinary of the Democratic Specialist Republic of Sri Lanka - 1993.06.24	コピー	The Democratic Socialist Republic of Sri Lanka
4.	Organization Structure, Central Environmental Authority	コピー	Central Environmental Authority
5.	National Environmental Action Plan 1992-1996	コピー、リング製本	Ministry of Environment and Parliamental Affairs
6.	National Environmental Action Plan 1995-1998 (Revised Draft)	コピー、リング製本	Ministry of Environment and Parliamental Affairs
7.	Environmental Profile - Nuwara Eliya District	コピー	Central Environmental Authority
8.	Environmental Profile of the Kandy District (Final Draft)	コピー	Central Environmental Authority
9.	Environmental Quality Standards and Designation of Water Use in Sri Lanka	コピー	Central Environmental Authority
10.	Guidance for Implementing the Environmental Impact Assessment (EIA) Process - No.1: A General Guide for Project Approving Agencies (PAA), Second Edition	図書	Central Environmental Authority
11.	Guidance for Implementing the Environmental Impact Assessment (EIA) Process - No.2: A General Guide for Conducting Environmental Scoping	図書	Central Environmental Authority
12.	Environmental Guidelines for Road and Rail Development in Sri Lanka	図書	Central Environmental Authority
13.	スリランカの環境保護に関する規制	コピー	海外経済協力基金
14.	Environmental Impact Assessment - The Sri Lankan Experience	コピー	Centre for Environmental Studies, University of Peradeniya / USAID
組織制度関連			
1.	Provincial Councils: Operational Experience of Devolution, 1996	図書	Ministry of Co-operative, Provincial Councils, Local Government & Indigenous Medicine
2.	National Water Supply & Drainage Board, cadre - 1996 for the 05 Regional Support Centres	コピー	The National Water Supply & Drainage Board
3.	Local Government Institution Basic Information - Kandy Municipal Council, 1997	コピー	Department of Local Government, Central Provincial Council
4.	Local Government Institution Basic Information - Nuwara Eliya Municipal Council, 1997	コピー	Department of Local Government, Central Provincial Council
5.	Local Government Institution Basic Information - Kandy Kadawathsatara & Gagawata Korale Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
6.	Local Government Institution Basic Information - Patahewaheta Pradeshia sabha, 1997	コピー	Department of Local Government, Central Provincial Council
7.	Local Government Institution Basic Information - Pathadunbara Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
8.	Local Government Institution Basic Information - Udapalatha Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
9.	Local Government Institution Basic Information - Udunuwara Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
10.	Local Government Institution Basic Information - Nuwara Eliya Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council

	資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
11.	Local Government Institution Basic Information - Kundasale Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
12.	Local Government Institution Basic Information - Yatinuwara Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
13.	Local Government Institution Basic Information - Akurana Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
14.	Local Government Institution Basic Information - Harispattuwa Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council
15.	Local Government Institution Basic Information - Pujapitiya Pradeshia Sabha, 1997	コピー	Department of Local Government, Central Provincial Council

図　面

	資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
上水道関連			
1.	Water Supply Master Plan for Greater Kandy - Water Resources & Existing Water Supply Schemes in Kandy District	図面（A1）	FINNIDA / The National Water Supply & Drainage Board
2.	Kandy Water Supply Scheme - General Layout	図面（A2）	The National Water Supply & Drainage Board
3.	Water Supply Master Plan for Greater Kandy - Layout of Proposed Transmission Mains	図面（A0）	FINNIDA / The National Water Supply & Drainage Board
4.	Water Supply Master Plan for Greater Kandy - Block Diagram - Year 2015	図面（A0）	FINNIDA / The National Water Supply & Drainage Board
5.	Kandy Major Water Supply Scheme - Distribution Network	図面（A1）	The National Water Supply & Drainage Board
6.	Kadugannwa Water Supply Pumping Main & Reservoir Site Plans & Key Plan	図面（A0）	The National Water Supply & Drainage Board
7.	Wattegama Water Supply - Gravity Main - Sheet 1	図面（A1）	The National Water Supply & Drainage Board
8.	Wattegama Water Supply - Gravity Main - Sheet 2	図面（A1）	The National Water Supply & Drainage Board
9.	Wattegama Water Supply - Gravity Main - Sheet 3	図面（A1）	The National Water Supply & Drainage Board
10.	Wattegama Water Supply - New Gravity Main	図面（A1）	The National Water Supply & Drainage Board
11.	Udunuwara-Yatinuwara Water Supply - Distribution System & Key Plan	図面（A1）	The National Water Supply & Drainage Board
12.	Udunuwara-Yatinuwara Water Supply - Distribution System & Key Plan	図面（A0）	The National Water Supply & Drainage Board
13.	Polgolla Water Supply Scheme - Key Plan of Pumping Main	図面（A1）	The National Water Supply & Drainage Board
14.	Polgolla Water Supply - Key Plan	図面（A1）	The National Water Supply & Drainage Board
15.	Polgolla Water Supply Scheme - Layout Plan & Control Room Details	図面（A1）	The National Water Supply & Drainage Board
16.	Polgolla & Balanaga Water Supply Schemes - Completion Plan	図面（A1）	The National Water Supply & Drainage Board
17.	Polgolla Water Supply (Kahalla extension) - Key Plan (Distribution System)	図面（A1）	The National Water Supply & Drainage Board

資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
18. Balanagala Water Supply Scheme - Completion Plan	図面（A1）	The National Water Supply & Drainage Board
19. Balanagala Water Supply Scheme - Longitudinal Section of Pumping Main	図面（A1）	The National Water Supply & Drainage Board
20. Ampitiya Water Supply - Layout Plan of Treatment Plant	図面（A1）	The National Water Supply & Drainage Board
21. Ampitiya Water Supply - Plan of Gravity Main and Pumping Main	図面（A1）	The National Water Supply & Drainage Board
22. School of Agriculture Water Supply - Kundasale - Hydraulic Profile and Site Plan	図面（A1）	The National Water Supply & Drainage Board
23. Menikhinna Water Supply Scheme - Key Plan & Junction Details	図面（A1）	The National Water Supply & Drainage Board
24. Marassana Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
25. Marassana Water Supply Scheme - Layout Plan & Hydraulic Profile	図面（A1）	The National Water Supply & Drainage Board
26. Marassana Water Supply Scheme - Detail of Land Scaping	図面（A1）	The National Water Supply & Drainage Board
27. Pallekele Water Supply Scheme - Key Plan, Tower Site, Boreholes Pipe Arrangements	図面（A1）	The National Water Supply & Drainage Board
28. Pahala Kadugannawa Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
29. Akurana Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
30. Galhinna Water Supply Scheme - Layout Plan of Pumping Main	図面（A1）	The National Water Supply & Drainage Board
31. Gohagoda Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
32. Hedeniya Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
33. Bokkawela Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
34. Alawatugoda Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
35. Hunnan Oya Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
36. Kondadeniya Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
37. Kulugammana Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
38. Haloluwa Water Supply Scheme - Key Plan	図面（A1）	The National Water Supply & Drainage Board
39. Nuwara Eliya Water Supply - Key Plan & Sub Project Location	図面（A1）	The National Water Supply & Drainage Board /Sir M MacDonald &
40. Nuwara Eliya Water Supply - Key Plan, Gravity Mains etc.	図面（A1）	The National Water Supply & Drainage Board /Sir M MacDonald &
41. Nuwara Eliya Water Supply - Distribution Key Plan (Sheet 1 of 2)	図面（A1）	The National Water Supply & Drainage Board /Sir M MacDonald &
42. Nuwara Eliya Water Supply - Distribution Key Plan (Sheet 2 of 2)	図面（A1）	The National Water Supply & Drainage Board /Sir M MacDonald &
下水道・衛生施設関連		
1. Catchment Areas of Kandy Town	図面（A0）	Urban Development Authority

資料の名称	形態（図書・ビデオ・地図・写真等）	発行機関
2. Storm Water Drainage in Nuwara Eliya - Layout Plan of Proposed Work at UDA Pusellawa Road, Lawson Street and Badulla Road	図面（A1）	Urban Development Authority
3. Storm Water Drainage in Nuwara Eliya - Layout Plan of Proposed Work at Edirisinghe Road and Mahinda Mawatha Housing Scheme	図面（A1）	Urban Development Authority
一般（調査地域）		
1. Map of Kandy Town (approx. 1 : 6600)	図面（A0）	Survey Department, Sri Lanka
2. Greater Kandy Development Plan	図面（A0）	Urban Development Authority
3. Proposed Land Use Plan for Kandy Central Business District - Year 2016	図面（A0）	Urban Development Authority
4. Map of Kandy Town depicting Roads & Buildings	図面（A1）	Urban Development Authority
5. Nuwara Eliya Town Zoning Plan 1997 - 2016	図面（A0）	Urban Development Authority

6．面会者リスト

主要面談者リスト

在スリランカ日本大使館

金井 要	一等書記官
川村 文洋	一等書記官

国際協力事業団 スリランカ事務所

狩野 良昭	所長
鈴木 秀幸	
吉浦 伸二	

海外経済協力基金

古賀 龍太郎	首席駐在員

住宅・都市開発省（Ministry of Housing and Urban Development）

Mr. V. K. Nanayakkara	Secretary
Mr. C. H. De Tissera	Additional Secretary

中央州政府（Central Provincial Council）

Mr. K. B. Sirisena	Chief Secretary

財政省 外資局（Ministry of Finance, Department of External Resources）

Mr. J. H. J. Jayamaha	Director

国家計画局（Department of National Planning）

Ms. S. M. Karunaratne	Director
Mr. P. Sumanapala	Deputy Director

国家上下水道公社（National Water Supply & Drainage Board）

Mr. T. B. Madugalle	Chairman
Mr. S. B. Boyagane	Vice Chairman
Mr. P. M. R. Pathiraja	General Manager
Mr. S. Weeraratne	Additional General Manager (D)
Mr. W. A. Karunaratne	Additional General Manager (O)
Mr. P. U. Gunasinghe	Deputy General Manager (P&D)
Mr. H. G. Tilakaratne	Deputy General Manager (RSCC)

Mr. M. P. Fernando	Deputy General Manager (F)
Mr. S. J. P. Wijegoonawardene	Assistant General Manager
Mr. M. A. S. L. Attanayake	Regional Manager (Kandy)
Mr. R. H. Ruvinis	Project Manager
Mr. P. H. S. Gamini	Chief Engineer
Mr. N. Padmasiri	Chief of Laboratory Services
Mr. D. Gunatilleke	Engineer
石原 平八郎	JICA Expert

キャンディ市庁（Kandy Municipal Council）

Mr. H. Dunuwille	Mayor
Mr. S. D. Piyadasa	Municipal Commissioner
Mr. S. Wijayaratne	Chief Works Engineer
Dr. S. Ekanayake (Ms.)	Chief Medical Officer of Health

ヌワラエリア市庁（Nuwara Eliya Municipal Council）

Mr. A. W. D. B. Seneviratne	Mayor
Mr. L. Nearube	Deputy Mayor
Mr. R. B. Abeysinghe	Municipal Commissioner
Mr. S. E. Jayarajah	Municipal Engineer

都市開発庁（Urban Development Authority）

Mr. P. Silva	Director
Mr. S. Wijeratne	Deputy Director
Mr. W. A. Siriwardena	Deputy Director

中央環境庁（Central Environmental Authority）

Mr. W. A. D. D. Wijesooriya	Director, Natural Resources Management

UNICEF

Mr. W. A. N. Weerasinghe	Project Officer
Ms. Yoshie Yamamoto	Assistant Project Officer

7．関連資料（現地調査経費資料）

現地調査費用（1997年10月調査）

1 Rs（スリランカ・ルピー）≒ 2円（1997年10月現在）

項目	単位	金額 (Rs)	備考
1. 事務諸費用			
電気料金	kWh	5.60	
事務机	no.	2,250	両袖机
椅子	no.	3,250	
本棚	no.	1,100	
電気スタンド	no.	4,830	
コピー機	no.	230,000	
コピー機（レンタル）	no.	25,000	一ヶ月 + 1.5 Rs per page
コピー料金（A4）	no.	3.50	白黒
コピー料金（A4, カラー）	no.	5.50	
パソコン	no.	115,000	Pentium160, 16MB memory, 17 inch. monitor
パソコン（レンタル）	no.	8,000	同上, 一ヶ月
フロッピーディスク	no.	65	3.5 inch.
プリンター	no.	36,400	レーザープリンター, A4
プリンター（レンタル）	no.	5,000	同上
A4用紙 （1000枚）	束	600	コピー機・プリンター用
ソフトウェアー （MS Office97）	set	36,000	
携帯電話	no.	9,900	
携帯電話（レンタル）	no.	599	一ヶ月 + 12.50 Rs/call dial 10.00 Rs/call receive 4.00 Rs/call dial & receive (after 8 pm)
2. 人件費			
エンジニア（土木・環境）	人・日	4,300	7時間勤務
エンジニア補	人・日	2,700	
事務員	人・日	500	
タイピスト	人・日	650	
ドラフトマン	人・日	950	
労務者	人・日	400	
運転手	人・日	480	
ガードマン	人・日	450	

項目	単位	金額 (Rs)	備考
6. 水質試験費			CISIR の見積りによる
pH	ｻﾝﾌﾟﾙ	200	
濁度	ｻﾝﾌﾟﾙ	200	
伝導度	ｻﾝﾌﾟﾙ	200	
溶存酸素	ｻﾝﾌﾟﾙ	200	
BOD_5	ｻﾝﾌﾟﾙ	500	
COD_{Mn}	ｻﾝﾌﾟﾙ	800	
SS	ｻﾝﾌﾟﾙ	500	
TDS	ｻﾝﾌﾟﾙ	500	
大腸菌	ｻﾝﾌﾟﾙ	600	
一般細菌.	ｻﾝﾌﾟﾙ	600	
NH_4-N	ｻﾝﾌﾟﾙ	500	
NO_3-N	ｻﾝﾌﾟﾙ	800	
NO_2-N	ｻﾝﾌﾟﾙ	800	
T-N	ｻﾝﾌﾟﾙ	1000	
PO_4-P	ｻﾝﾌﾟﾙ	800	
鉄	ｻﾝﾌﾟﾙ	800	
マンガン	ｻﾝﾌﾟﾙ	800	
マグネシウム	ｻﾝﾌﾟﾙ	500	
カドニウム	ｻﾝﾌﾟﾙ	800	
シアン	ｻﾝﾌﾟﾙ	800	
鉛	ｻﾝﾌﾟﾙ	800	
銅	ｻﾝﾌﾟﾙ	800	
フェノール	ｻﾝﾌﾟﾙ	800	
農薬	ｻﾝﾌﾟﾙ	9000	31 種類
飲料水水質基準全項目	ｻﾝﾌﾟﾙ	6200	スリ・ランカ国基準

項目	単位	金額 (Rs)	備考
7. 環境調査			
初期環境調査（IEE） (Ceywater)	式	400,000	M/P 対象全地域 上水道・下水／衛生を含む
同上 (EEC)	式	300,000	同上
環境影響評価（EIA） (Ceywater)	式	1,000,000	F/S 対象地域 上水道・下水／衛生を含む
同上 (EEC)	式	1,400,000	同上

TOLERANCE LIMITS FOR INLAND SURFACE WATERS FOR USE

AS RAW WATER FOR PUBLIC WATER SUPPLY

SRI LANKA STANDARD 722 : 1985)

	Determinant	Tolerance limit
1.	Colifora organisas (aonthly average, aost probable nuaber (MPN) per 100 al.	Rot aore than 5000, with less than 5 percent of the saaples with value 20,000, and less than 20 percent of the saaples with value 5000.
2.	pH range at aabient teaperature	6.0 to 9.0
3.	Chloride (as Cl) ag/l, aax.	1,200
4.	Nitrate (as N) ag/l, aax.	10
5.	Fluoride (as F) ag/l, aax.	1.5
6.	Phenolic coapounds (as phenolic OH) ag/l, aax.	0.005
7.	Oils and grease ag/l, aax.	0.1
8.	Pesticide residue	As per WHO/FAO requireaents
9.	Arseaic (as As) ag/l, aax.	0.05
10.	Cyanide (as CN) ag/l, aax.	0.05
11.	Lead (as Pb), ag/l, aax.	0.01
12.	Hercury (total as Hg), ag/l, aax.	0.001
13.	Seleniua (as Se) ag/l, aax.	0.05
14.	Chroaiua (as Se) ag/l, aax.	0.05
15.	Dissolved oxygea (DO), ag/l, aax.	4
16.	Biocheaical oxygea deaand (BOD) ag/l, aax.	5
17.	Radio active aaterial :	
	a. Alpha eaitters uc/al, aax:	10^{-9}
	b. Beta eaitters uc/al, aax.	10^{-8}

Table 2.1

Specification for Potable Water

SLS 614 (1983)

PART 1 - PHYSICAL AND CHEMICAL REQUIREMENTS

Characteristic	Maximum Desirable Level	Maximum Permissible Level
pH	7.0 - 8.5 units	6.5 - 9.0 units
Colour	5 units	30 units
Odour	Unobjectionable	Unobjectionable
Taste	"	"
Turbidity	2-JTU	8-JTU
Elect.Conductivity	750 uS/cm	3500 uS/cm
Chloride (Cl)	200 mg/L	1200 mg/L
Chlorine-Free resid(Cl)	-	0.2 "
Alkalinity (as CaCO	200 "	400 "
Ammonia-Free	-	0.06 "
Ammonia-Albuminoid	-	0.15 "
Nitrate (as N)	-	10 "
Nitrite (as N)	-	0.01 "
Fluoride (as F)	0.6 "	1.5 "
Phosphates-Total (PO)	-	2.0 "
Total Solids	500 "	2000 "
Hardness Total (as Ca Co)	250 "	600 "
Iron-Total (as Fe)	0.3 "	1.0 "
Sulphate	200 "	400 "
Calcium	100 "	240 "
Magnesium	30 to 150 *	150 "
Copper	0.05	1.5 "
Manganese	0.05 "	0.5 "
Zinc	5.0 "	15.0 "
Aluminium	-	0.2 "
Arsenic	-	0.05 "
Cadmium	-	0.005 "
Cyanide	-	0.05 "
Lead	-	0.05 "
Mercury	-	0.001 "
Selenium	-	0.01 "
Chromium	-	0.05 "
Anionic Detergents (as MBAS-LAS)	0.2 mg/L	1.0 mg/L
Phenolic Compounds (as Phenolic OH)	0.001 "	0.002 "
Oil & Grease	-	1.0 "
Pesticide Residue	(Refer to WHO &	FAO requirements)
Chem. Oxygen Demand (COD)		10 mg/L

* Depending on sulphate content, i.e. for 250 mg/L sulphate, max Mg. is 30 mg/L; for less sulphate, more Mg is allowed

Table 2.2

Specification for Potable Water

SLS 614 (1983)

PART 2 - BACTERIOLOGICAL REQUIREMENTS

Requirements

1. Pipe-borne water supplies:

   - Throughout any year, 95 per cent of the samples shall not contain any coliform organisms in 100 mL.
   - None of the samples examined shall contain more than 10 coliform organisms per 100 mL.
   - Coliform organisms shall not be detectable in 100 mL of any two consecutive samples.
   - None of the samples examined shall contain E.coli in 100 mL. (Faecal coliform).

2. Individual or small community supplies:

   - None of the samples examined shall contain more than 20 coliform organisms per 100 mL on repeated examination.
   - No sample shall contain E. coli in 100 mL. (Faecal coliform)

NOTE: Individual or small community supplies include wells, bores and springs.

Frequency of Sampling for Pipe Borne Water

Population Served	Maximum Interval Between Successive Samples	Minimum Number of Samples to be Taken From Whole Distrib. System Each Month
Less than 20,000	1 Month	1 Sample per 5000 popn.
20,000 to 50,000	2 Weeks	- do -
50,000 to 100,000	4 Days	- do -
More than 100,000	1 Day	1 Sample per 10000 popn.

別添２　ＣＥＡが定める排水基準

別添2-1 内陸の表流水に放流する際の一般的な排水基準
（特定の業種別排水基準が定められていない業種に対して適用される排水基準）

No.	項　目	単　位	最大許容値
1	浮遊粒子状物質	mg/ℓ	50　以下
2	浮遊粒子状物質の粒径		850ミクロンのフィルター を通るもの
3	pH		6.0～8.5
4	ＢＯＤ（20℃５日間）	mg/ℓ	30以下
5	温度	℃	放流口より15m下流で40℃以下
6	油分	mg/ℓ	10.0以下
7	フェノール	mg/ℓ	1.0以下
8	シアン化物	mg/ℓ	0.2以下
9	硫化物	mg/ℓ	2.0以下
10	フッ化物	mg/ℓ	2.0以下
11	遊離塩素	mg/ℓ	1.0以下
12	砒素	mg/ℓ	0.2以下
13	カドミウム	mg/ℓ	0.1以下
14	全クロム	mg/ℓ	0.1以下
15	銅	mg/ℓ	3.0以下
16	鉛	mg/ℓ	0.1以下
17	水銀	mg/ℓ	0.0005 以下
18	ニッケル	mg/ℓ	3.0以下
19	セレン	mg/ℓ	0.05 以下
20	亜鉛	mg/ℓ	5.0以下
21	アンモニア態窒素	mg/ℓ	50.0以下
22	農薬	mg/ℓ	検出されないこと（検出限界不明）
23	放射性物質		
	(a)α線を出す物質	μcurie/mℓ	10^{-7}
	(b)β線を出す物質	μcurie/mℓ	10^{-8}
24	ＣＯＤ	mg/ℓ	250　以下

1)色・においは可能な限り取り除くものとする。
2)上記の基準値は排水が放流により８倍以上に希釈される場合について適用できるものとする。希釈率が８倍以下の場合には、上記基準値に実際の希釈率×1/8 を乗じた値を適用する。
3)上記の基準値は業種別排水基準が特に定められてはいない業種に対して適用するものとする。
出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

別添2-2 灌漑用水として土壌に散布する場合の産業排水基準

No.	項　目	単　位	最大許容値
1	溶存固形分	mg/ℓ	2100　以下
2	pH		5.5～9.0
3	ＢＯＤ（20℃５日間）	mg/ℓ	250　以下
4	油分	mg/ℓ	10.0以下
5	遊離塩素（Clとして）	mg/ℓ	600　以下
6	硫化物　(SO_4として)	mg/ℓ	1000　以下
7	ホウ素(Bとして)	mg/ℓ	2.0以下
8	砒素	mg/ℓ	0.2以下
9	カドミウム	mg/ℓ	2.0以下
10	全クロム	mg/ℓ	1.0以下
11	鉛	mg/ℓ	1.0以下
12	水銀	mg/ℓ	0.01 以下
13	ナトリウム吸収率(SAR)		10～15
14	炭酸ナトリウム残基	mol/ℓ	2.5以下
15	放射性物質		
	(a)α線を出す物質	μcurie/mℓ	10^{-9}
	(b)β線を出す物質	μcurie/mℓ	10^{-8}

出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

別添2-3 沿岸海域に放流する場合の産業排水および家庭排水基準

No.	項　目	単　位	最大許容値
1	浮遊粒子状物質 製造工程に使用した水 冷却水	mg/ℓ	 50 以下 原水浮遊粒子量の1割増以下
2	浮遊粒子状物質の粒径 水に浮く物質 水に浮かない物質		 3 mm 以下 850ミクロンのフィルター を通るもの
3	pH		6.0～8.5
4	BOD (20℃5日間)	mg/ℓ	100 以下
5	温度	℃	放流口で45℃以下
6	油分	mg/ℓ	20 以下
7	遊離塩素	mg/ℓ	1.0以下
8	アンモニア態窒素	mg/ℓ	50.0以下
9	COD	mg/ℓ	250 以下
10	フェノール	mg/ℓ	5.0以下
11	シアン化物	mg/ℓ	0.2以下
12	硫化物	mg/ℓ	5.0以下
13	フッ化物	mg/ℓ	15 以下
14	砒素	mg/ℓ	0.2以下
15	カドミウム	mg/ℓ	2.0以下
16	全クロム	mg/ℓ	1.0以下
17	銅	mg/ℓ	3.0以下
18	鉛	mg/ℓ	1.0以下
19	水銀	mg/ℓ	0.01 以下
20	ニッケル	mg/ℓ	5.0以下
21	セレン	mg/ℓ	0.05 以下
22	亜鉛	mg/ℓ	5.0以下
23	放射性物質		
	(a)α線を出す物質	curie/mℓ	10^{-8}
	(b)β線を出す物質	curie/mℓ	10^{-7}
24	有機リン化合物	mg/ℓ	1.0以下
25	有機塩素化合物	mg/ℓ	0.02 以下

1)色・においは可能な限り取り除くものとする。
2)上記の基準値は排水が放流により8倍以上に希釈される場合について適用できるものとする。希釈率が8倍以下の場合には、上記基準値に実際の希釈率×1/8 を乗じた値を適用する。
出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

別添2-4 ゴム製造業から内陸の表流水に放流する際の排水基準

No.	項　目	単　位	最大許容値
1	pH		6.0~8.5
2	溶存固形分	mg/ℓ	100　以下
3	総固形分	mg/ℓ	1500　以下
4	BOD（20℃5日間）	mg/ℓ	60　以下
5	COD	mg/ℓ	400　以下
6	全窒素	mg/ℓ	300　以下
7	アンモニア態窒素	mg/ℓ	300　以下
8	硫化物	mg/ℓ	2.0以下

1)色・においは可能な限り取り除くものとする。
2)上記の基準値は排水が放流により8倍以上に希釈される場合について適用できるものとする。希釈率が8倍以下の場合には、上記基準値に実際の希釈率×1/8 を乗じた値を適用する。
出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

別添2-5 衣料品製造業から内陸の表流水に放流する際の排水基準

No.	項　目	単　位	最大許容値
1	pH		6.0~8.5
2	温度	℃	サンプリング地点で40℃以下
3	総固形分	mg/ℓ	50　以下
4	BOD（20℃5日間）	mg/ℓ	60　以下
5	COD	mg/ℓ	250　以下
6	油分	mg/ℓ	10.0以下
7	フェノール	mg/ℓ	1.0以下
8	全クロム	mg/ℓ	2.0以下
9	6価クロム	mg/ℓ	0.5以下
10	銅	mg/ℓ	3.0以下
11	亜鉛	mg/ℓ	5.0以下
12	アンモニア態窒素	mg/ℓ	60　以下
13	塩化物（Clとして）	mg/ℓ	70　以下

1)色・においは可能な限り取り除くものとする。
2)上記の基準値は排水が放流により8倍以上に希釈される場合について適用できるものとする。希釈率が8倍以下の場合には、上記基準値に実際の希釈率×1/8 を乗じた値を適用する。
出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

別添2-6 皮革加工業から内陸の表流水または沿岸海域に放流する際の排水基準

別添2-6-1 皮革加工業から内陸の表流水に放流する際の排水基準

No.	項　目	単　位	最大許容値
1	pH		5.5～9.0
2	総固形分	mg/ℓ	100　以下
3	BOD（20℃5日間）	mg/ℓ	60　以下
4	COD	mg/ℓ	250　以下
5	ｱﾙｶﾘ度（$CaCO_3$として）	℃	750　以下
6	塩化物（Clとして）	mg/ℓ	1000　以下
7	6価クロム	mg/ℓ	0.5以下
8	全クロム	mg/ℓ	2.0以下
9	油分	mg/ℓ	10.0以下
10	フェノール	mg/ℓ	1.0以下
11	硫化物	mg/ℓ	2.0以下

別添2-6-2 皮革加工業から沿岸海域に放流する際の排水基準

No.	項　目	単　位	最大許容値
1	pH		5.5～9.0
2	総固形分	mg/ℓ	150　以下
3	BOD（20℃5日間）	mg/ℓ	100　以下
4	COD	mg/ℓ	300　以下
5	ｱﾙｶﾘ度（$CaCO_3$として）	℃	定めていない
6	塩化物（Clとして）	mg/ℓ	定めていない
7	6価クロム	mg/ℓ	0.5以下
8	全クロム	mg/ℓ	2.0以下
9	油分	mg/ℓ	20.0以下
10	フェノール	mg/ℓ	5.0以下
11	硫化物	mg/ℓ	5.0以下

1)色・においは可能な限り取り除くものとする。

2)上記の基準値は排水が放流により8倍以上に希釈される場合について適用できるものとする。希釈率が8倍以下の場合には、上記基準値に実際の希釈率×1/8 を乗じた値を適用する。

出典：The Gazette of the Democratic Socialist Republic of Sri Lanka. No.595/16 dated 2nd Feb. 1990

when connecting to sewerage.

TABLE B4

CENTRAL ENVIRONMENTAL AUTHORITY: INTERIM STANDARDS

TOLERANCE LIMITS FOR INDUSTRIAL WASTE WATER DISCHARGED INTO

PUBLIC (COMMON) SEWER FOR FURTHER TREATMENT

Ref. Indian Standard 3306: 1974 with modifications

Parameters	Values (Not to Exceed)
BOD in 5 days at 20°C, mg/l	200
pH	6 - 8.5
Suspended solids, mg/l	500
Temperature °C	45
Phenolic compounds, mg/l (as C_6H_5OH)	5, (up to 50 if secondary treatment provided)
Oils and grease, mg/l	30
Cyanides, mg/l	2
Chromium, (Hexavalent) mg/l	2
Copper, mg/l	3
Lead, mg/l	1
Nickel, mg/l	2
Zinc, mg/l	10
Ammonical Nitrogen, mg/l	50
Radioactive materials	
Alpha emitters, c/ml	10^{-7}
Beta emitters, c/ml	10^{-6}
If effluent used for irrigation	
Boron, mg/l	2
Percent sodium	60
Total dissolved solids	2,100
Chlorides as Cl, mg/l	1,000

The quality of waste water discharged into common sewer or collection system should be such as to ensure that the waste water:

a. does not damage the sewer by physical or chemical action
b. does not endanger the health of the workers cleaning the sewer
c. does not upset the processes that are normally used in sewage treatment
d. does not overload the common treatment plant
e. does not damage the crops or affect the soil in case the effluent after treatment is used for irrigation; and
f. does not create fire and explosion hazards due to constituents present in the effluent.

Industrial effluents containing solids such as ash, sand, feathers, large floatables, straw, plastics, wood, lime, slurry, beer or distillery slops, chemical or paint residues, gross solids from cannery wastes, tar, hair, rag, metal shavings, garbage and broken glass, shall not be permitted to be discharged into public (common) sewers.