

**Japan International Cooperation Agency(JICA)
Water Supply Authority,
Department of Housing and Urban Planning,
Ministry of Communication, Transport,
Post and Construction, Lao PDR**

**The Study
on
Vientiane Water Supply Development Project
in
Lao People's Democratic Republic**

Final Report

**Volume III
Main Report: Feasibility Study**

January 2004

Nihon Suido Consultants Co., Ltd.

Exchange Rate Applied
1 US Dollar = Yen 119 as of April30, 2003
1 US Dollar = Lao Kip 10,720 as of April30, 2003

PREFACE

In response to a request from the Lao People's Democratic Republic, the Government of Japan decided to conduct the Study on Vientiane Water Supply Development Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Takemasa MAMIYA of NIHON SUIDO CONSULTANTS CO., LTD. to the Lao People's Democratic Republic between March 2003 and November 2003. In addition, JICA set up an advisory committee headed by Mr. Yoshiki OMURA, Senior Advisor, Institute for International Cooperation JICA, between March 2003 and November 2003, which examined the study from specialist and technical point of view.

The team held discussions with the officials concerned of the Lao People's Democratic Republic and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of Lao People's Democratic Republic for their close cooperation extended to the team.

January, 2004

Kazuhisa MATSUOKA
Vice-President
Japan International Cooperation Agency

January, 2004

Mr. Kazuhisa Matsuoka
Vice-President
Japan International Cooperation Agency

Letter of Transmittal

Dear Sir,

We are pleased to submit this Final Report on the Study on Vientiane Water Supply Development Project in Lao People's Democratic Republic. This report incorporates the views and suggestions of the authorities concerned of the Government of Japan, including your Japan International Cooperation Agency (JICA). It also includes the comments made by Water Supply Authority (WASA), Department of Housing and Urban Planning (DHUP), Ministry of Communication, Transport, Post and Construction (MCTPC), Water Supply Company of the Vientiane Capital City (NPVC), Vientiane Capital City and other government agencies concerned in the Lao People's Democratic Republic during the meeting in Vientiane where the Draft Final Report was discussed.

The Final Report comprises a total of five volumes as listed below.

- Volume I : Executive Summary
- Volume II : Main Report, Master Plan
- Volume III : Main Report, Feasibility Study
- Volume IV : Annex for Master Plan
- Volume V : Annex for Feasibility Study

This report contains the Study Team's findings, conclusions and recommendations derived from the three phases. The main objective of the Phase I was to conduct a reconnaissance survey. That of Phase II was to formulate a long term master plan and to identify priority projects, whilst that of the Phase III was to examine the feasibility of the priority project which had previously been identified in Master Plan during the course of the Phase II.

We wish to take this opportunity to express our sincere gratitude to your Agency (JICA), the Ministry of Foreign Affairs and the Ministry of Health, Labour and Welfare of the Government of Japan for their valuable advice and suggestions. We would also like to express our deep appreciation to the relevant offices for Water Supply Authority (WASA), Department of Housing and Urban Planning (DHUP), Ministry of Communication, Transport, Post and Construction (MCTPC), Water Supply Company of the Vientiane Capital City (NPVC), and other agencies of the Lao People's Democratic Republic for their cooperation and assistance extended to us throughout our Study.

Very truly yours,

Takemasa Mamiya, Team Leader
The Study on Vientiane Water Supply
Development Project in Lao People's
Democratic Republic

**Volume I
Executive Summary**

1. Introduction
2. Development Plan of Vientiane Capital City
3. Existing Conditions
4. Master Plan
5. Feasibility Study
6. Conclusions and Recommendations

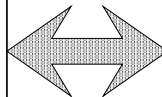
Structure of the Final Report

**Volume II
Main Report:
Master Plan**

1. Introduction
2. General Condition of the Study Area
3. The Existing Condition of the Vientiane Water Supply System
4. Master Plan
5. Selection of Priority Projects
6. Initial Environmental Examination (IEE)
7. Evaluation of the Master Plan and Recommendations
8. Technology Transfer During the Study

**Volume IV
Annex for
Master Plan**

- A1. Minutes of Meetings
- A2. Member List of the JICA Study Team
- A3. List of Counterparts
- A4. Socio-economic Conditions
- A5. Village Population in Vientiane Capital City
- A6. Village in The Service Area by NPVC Sub-Zone
- A7. Record of Water Level of the Mekong River and the Nam Ngum River
- A8. Results of Water Quality Analysis of Nam Ngum Dam and River
- A9. Details of Treatment Plants
- A10. Results of 24 Hour Flow Survey
- A11. Results of Network Analysis on Existing Pipe Network
- A12. Forms and Results of Questionnaire Survey
- A13. Population and Served Population of Villages in Vientiane Capital City
- A14. Facility Planning for Alternative Study
- A15. Network Analysis for Alternative Study
- A16. Comparative Study of Alternatives
- A17. Reduction of Unaccounted-for Water
- A18. Economic and Financial Evaluation
- A19. Initial Environmental Examination (IEE)
- A20. Influence by the Delay of Distribution System Improvement: Analysis and Measures
- A21. Network Analysis for Identification on Minimum Requirements of Distribution Pipes
- A22. Options for the 2nd Stage Project Scale
- A23. PCM Workshop for Technology Transfer



**Volume III
Main Report:
Feasibility Study**

1. Introduction
2. Framework of the Feasibility Study
3. Preliminary Design of the Priority Projects
4. Strengthening of Institutional Capacity
5. Preliminary Cost Estimates for the 1st Stage Project
6. Project Implementation and Disbursement Schedule
7. Economic and Financial Analysis
8. Environmental Impact Assessment
9. Project Evaluation
10. Conclusions and Recommendations

**Volume V
Annex for
Feasibility Study**

- A24. Served Population and Water Demand of Respective Villages Covered by the Priority Projects
- A25. Details of Preliminary Design
- A26. Analysis on Non-Domestic Water Consumption
- A27. NPVC Challenges for Water Conservation/ Water Demand Management (WC/WDM)
- A28. Economic and Financial Analysis
- A29. Drawings

