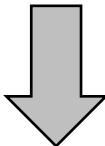


添付資料 A

PDM

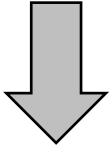
Project Design Matrix

Project Title: Project for Enhancing Management Capacity of Sewerage Works in the Socialist Republic of Vietnam
 Implementing Agency: Ministry of Construction (MOC), Vietnam
 Target Group: MOC, College of Urban Civil Works (CUWC), Vietnam Water Supply and Sewerage Association (VWSA), Provincial People's Committees (PPCs) and Private Companies
 Period of Project: 3 Years and 4 Months from Feb. 2016 to May 2019
 Project Site: Ha Noi Area

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
To enhance the planning, implementation and management capacity of the sewerage sector to meet the future needs in Vietnam.	• The number of city implementing sewerage works, the number of STP increase.	• Reports from MOC and PPCs.	
Project Purpose			
Establishment planning documents for Sewerage Center is proposed and refined based on the result of the pilot projects.	• Rules and duties of Sewerage Works center are drafted with the provision of the function of training, licensing, project implementation support and research & development.	• Draft rules and duties of Sewerage Works Center • Monitoring and management records • Hearing from staff members.	• The policies relating to sewerage sector management are not changed drastically even after the revision of the Sewerage Orientation.
Outputs			
1. Comprehensive needs of human resource development for sewerage sector is identified.	• Needs survey of human resource development is implemented.	• Needs survey reports	• The institutional setups for the Project implementation are not changed drastically.
2. Structure of the organization, function, tasks and business plan for the Sewerage Center are drafted.	• Organization and Business plan for Sewerage Works are drafted.	• Organization and Business plan for Sewerage Works	
3. The Basic pilot training for sewerage sector implemented.	• A training program is drafted.	• Basic training program/report	
4. Pilot activities for the Project Implementation Support function are implemented.	• Project implementation support function of Sewerage Works is drafted.	• Draft/report TOR for Project implementation support function of Sewerage Works	
5. The pilot activities for consulting and research and development for the sewerage sector in Vietnam are implemented.	• Research and Development function of Sewerage Works is drafted.	• Draft/report TOR for Research and Development function of Sewerage Works	
Activities	Inputs		Pre-Conditions
1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development, organize survey and identify needs on training. 1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects). 1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects. 2-1 Based on Activity 1, support the establishment of the Sewerage Center Establishment Preparation Unit (in charge of VSC-MOC) by drafting necessary organizational documents, etc. 2-2 Based on Activity 1, draft the functions, structure of the organization, and business plan of Sewerage Center by referring to the Japan Sewerage Works Agency and Japan Sewerage Works Association. 2-3 Supporting the institutionalization of business plan and finalization of the Center-establishment dossier to be submitted to the competent authority based on activities 2-1, 2-2. 3-1 Setting up and Designing the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works. 3-2 Preparing the training materials in English and Vietnamese as trial basis. 3-3 Identifying training programs based on targeted participants, Conduct the basic training courses for planning, operation and management, etc. 3-4 Reflecting the evaluation results of activity 3-3 to modify the training program. 3-5 Preparing the plan for training facilities and equipment. 4-1 Elaborate mid- and long-term planning for implementation support function. 4-2 Selecting the pilot activity for the project implementation support. 4-3 Implementing the pilot activity on project implementation support. 5-1 Preparing the mid-and long-term plan for Research and Development based on needs, current issues and implementation setup (such as the development of standards, specification, technologies, guidelines, etc.) 5-2 Support the setup of Research and development team. 5-3 Organize and Implement the pilot activity for the Research and Development function.	1. Experts Consultants - Basic survey - Organization / Business plan - Training (Training curriculum development, course material development, etc.) - Project implementation (Project identification, contract procedure, project management) - Research & development (Project identification, contract procedure, project management) Short term Expert (trainer) - Planning - Design - O&M of sewerage facilities - Asset management - Financial management 2. Training Training in Japan - Japan Sewerage Works agency - Japan Sewerage Works Association 3. Machinery and Equipment - Procurement of training facilities and equipment as defined in consideration of activity 3-5 4. Local Cost - Expenses necessary for personnel of secretary and translator - Expenses necessary for contract of local consultant (basic survey) - Expenses necessary for accommodation of JICA experts' activities - Expenses necessary for hiring local staff - Expenses necessary for purchasing equipment served for pilot activities of the Center.	1. Counterpart staff - Sufficient number of Counterpart staff - One (1) Director of Vietnam Sewerage Center - One (1) Accountant - Two (2) Officer in charge of training - Two (2) Officer for implementing support - Two (2) Officer for research and development - Management staff for the organization / business model - Management staff for the training curriculum / trainer 2. Facilities (MOC, CUWC) - Two project offices with necessary furniture, air-conditioners, internet facility, etc. 3. Counter budget - Salaries and allowances for the Vietnamese counterpart staffs - Costs for O&M of equipment provided by the Japanese side 4. On-site training for STP O&M - Adjustment and agreement of cooperation about on-site training of STP 5. Requesting support to municipalities for realizing implementation support and research & development functions	The inputs from the Vietnamese side are secured. - Ensure the attribution of counterpart after the establishment of Vietnam Sewerage Center - Ensure the budget from Vietnamese side - Cooperation of Vietnamese side for assuring participants in training courses - Elaborating the issues above on R/D  <Issues and countermeasures>

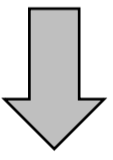
Project Design Matrix

Project Title: Project for Enhancing Management Capacity of Sewerage Works in the Socialist Republic of Vietnam
 Implementing Agency: Ministry of Construction (MOC), Vietnam
 Target Group: MOC, College of Urban Civil Works (CUWC), Vietnam Water Supply and Sewerage Association (VWSA), Provincial People's Committees (PPCs) and Private Companies
 Period of Project: 3 Years and 4 Months from Feb. 2016 to May 2019
 Project Site: Overall Vietnam (Training will be implemented in Northern Vietnam, Central Vietnam, and Southern Vietnam.)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
To enhance the planning, implementation and management capacity of the sewerage sector to meet the future needs in Vietnam.	• The number of city implementing sewerage works (including the number of cities that have been developing sewerage and drainage master plan) increase.	• Reports from MOC and PPCs.	
Project Purpose			
MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.	• Organization Structure to implement trainings (CUWC) • Quality of contents for training	• Document about organization to implement trainings • Survey on Training Implementation (i.e. Questionnaire to trainees) • Financial document related to implement trainings • Textbooks of trainings	• The policies relating to sewerage sector management are not changed drastically even after the revision of the Sewerage Orientation.
Outputs			
1. Comprehensive needs of human resource development for sewerage sector is identified.	• Needs survey of human resource development is implemented.	• Needs survey reports	• The institutional setups for the Project implementation are not changed drastically.
2. Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.	• Structure and establishment plan of the organization to implement training in the field of sewerage are submitted.	• Structure and establishment plan of the organization to implement training in the field of sewerage	
3. The Basic trainings are implemented based on the comprehensive curriculums.	• Comprehensive training curriculums are formulated. • Training textbooks are prepared based on the training curriculums. • The number of times and participants for implemented training	• Training implementation report, training curriculum and training textbook	
4. The experience and knowledges derived from development of sewerage and drainage Master Plan (MP) in a specific city is reflected to the contents of sewerage planning training.	• Sewerage and drainage Master Plan (MP) in a specific city	• Information provision from a specific local city	
Activities	Inputs		Pre-Conditions
1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development, organize survey and identify needs on training. 1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects). 1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects. 2-1 Based on Activity 1, structure and establishment plan of the organization to implement training in the field of sewerage are drafted by referring to the Japan Sewerage Works Agency and Japan Sewerage Works Association. 2-2 Based on 2-1, budget Plan for sustainable management of organization to implement trainings (including tuition collection from trainees and subsidy) are drafted. 2-3 Based on activities 2-1 and 2-2, structure and establishment plan of the organization to implement training in the field of sewerage are finalized and submitted to the competent authority. 3-1 Setting up and Designing the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works. 3-2 Preparing the training materials in English and Vietnamese as trial basis. 3-3 Identifying training programs based on targeted participants, and conducting the basic training courses for planning, implementation and management. 3-4 Reflecting the evaluation results of activity 3-3 to modify the training program. 3-5 Preparing the plan for training facilities and equipment. 4-1 Selecting a city to develop Sewerage and drainage MP 4-2 Support development of Sewerage and drainage MP in a specific city 4-3 Reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training * Activity 1, 2-1, 2-2, 3-1, 3-2, 3-3, 4-1 and 4-2 will be conducted as the Detailed Planning Phase.	The Japanese Side 1. Experts Long-term Experts - Sub Chief Advisor (sewerage and drainage MP development) - Training Experts / Project Coordination Consultants - Basic survey - Organization / Establishment plan - Training (Training curriculum development, course material development, etc.) - Sewerage and drainage MP development assistance (Project identification, contract procedure, project management) 2. Training Training in Japan - Local government implementing sewerage projects in japan - Japan Sewerage Works agency (JS) 3. Machinery and Equipment - Procurement of training facilities and equipment as defined in consideration of activity 3-5 4. Local Cost - Expenses necessary for personnel of secretary and translator - Expenses necessary for contract of local consultant (basic survey) - Expenses necessary for accommodation of JICA experts' activities - Expenses necessary for hiring local staff - Expenses necessary for procurement of equipment served for pilot activities.	The Vietnamese Side 1. Counterpart staff - Sufficient number of Counterpart staff (1) Ministry of Construction (MOC) - Member of Project Management Unit (PMU), including Project Director and Deputy Project Director - One full time counterpart - Two part-time counterparts (officials of Drainage & Sewerage and Wastewater Treatment Management Division of ATI) (2) College of Urban Works Construction (CUWC) - Project Manager - Responsible official of training - Staff in charge of training - Staff in charge of management of training curriculum and trainers - Lecturers 2. Facilities (MOC, CUWC) - Two project offices with necessary furniture, air-conditioners, internet facility, etc. 3. Counter budget - Salaries and allowances for the Vietnamese counterpart staffs - Costs for O&M of equipment provided by the Japanese side - Travel, communication and other expenses for Vietnamese trainers	The inputs from the Vietnamese side such as personnel and budget are procured and ensured. - Ensure the attribution of counterpart after the establishment of organization to implement training in the field of sewerage - Ensure the budget from Vietnamese side - Cooperation of Vietnamese side for assuring participants in training courses - Cooperation of Vietnamese side for assuring participants in training courses <div style="text-align: center;">  </div> <Issues and countermeasures>

Project Design Matrix

Project Title: Project for Enhancing Management Capacity of Sewage Works in the Socialist Republic of Vietnam
 Implementing Agency: Ministry of Construction (MOC), Vietnam
 Target Group: MOC, College of Urban Civil Works (CUWC), Vietnam Water Supply and Sewerage Association (VWSA), Provincial People's Committees (PPCs) and Private Companies
 Period of Project: 3 Years and 10 Months from Feb. 2016 to Nov 2019
 Project Site: Overall Vietnam (Training will be implemented in Northern Vietnam, Central Vietnam, and Southern Vietnam.)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
To enhance the planning, implementation and management capacity of the sewerage sector to meet the future needs in Vietnam.	• The number of city implementing sewerage works (including the number of cities that have been developing sewerage and drainage master plan) increase.	• Reports from MOC and PPCs.	
Project Purpose			
MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.	• Organization Structure to implement trainings (CUWC) • Quality of contents for training	• Document about organization to implement trainings • Survey on Training Implementation (i.e. Questionnaire to trainees) • Financial document related to implement trainings • Textbooks of trainings	• The policies relating to sewerage sector management are not changed drastically even after the revision of the Sewerage Orientation.
Outputs			
1. Comprehensive needs of human resource development for sewerage sector is identified.	• Needs survey of human resource development is implemented.	• Needs survey reports	• The institutional setups for the Project implementation are not changed drastically.
2. Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.	• Structure and establishment plan of the organization to implement training in the field of sewerage are submitted.	• Structure and establishment plan of the organization to implement training in the field of sewerage	
3. The Basic trainings are implemented based on the comprehensive curriculum. *1	• Comprehensive training curriculum and textbook for each basic training course are developed. • Each basic training course is conducted at least three times (North, Center, South)	• Training implementation report • Comprehensive training curriculum • Training textbook	
4. Sewerage and drainage Master Plan (MP) in a specific city is developed and the experience through the development of the MP is shared / reflected in the basic trainings.	• Approval of the sewerage and drainage Master Plan (MP) in a specific city • Contents of the basic trainings reflecting the experience through development of MP	• Information provision from a specific local city	
Activities	Inputs		Pre-Conditions
	The Japanese Side	The Vietnamese Side	
1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development, organize survey and identify needs on training 1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects). 1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects. 2-1 Based on Activity 1, structure and establishment plan of the organization to implement training in the field of sewerage are drafted by referring to the Japan Sewage Works Agency and Japan Sewage Works Association. 2-2 Based on 2-1, budget Plan for sustainable management of organization to implement trainings (including tuition collection from trainees and subsidy) are drafted. 2-3 Based on activities 2-1 and 2-2, structure and establishment plan of the organization to implement training in the field of sewerage are finalized and submitted to the competent authority. 3-1 To set up and design the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works. 3-2 To prepare the training materials in English and Vietnamese as trial basis. 3-3 To identify training programs based on targeted participants, and to conduct the basic training courses for planning, implementation and management. 3-4 To reflect the evaluation results of activity 3-3 to modify the training program. 3-5 To prepare the plan for training facilities and equipment. 3-6 To formulate SNS network of trainees. 3-7 To conduct seminars for appropriate sewerage planning and management. 4-1 To select a city to develop Sewerage and drainage MP 4-2 To support development of Sewerage and drainage MP in a specific city 4-3 To reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training * Activity 1, 2-1, 2-2, 3-1, 3-2, 3-3, 4-1 and 4-2 were conducted at the Detailed Planning Phase.	1. Experts Long-term Expert - Training / Project Coordination Short-term Experts - Basic survey - Organization / Establishment plan - Training (Training curriculum development, course material development, etc.) - Sewerage and drainage MP development assistance (Project identification, contract procedure, project management) - Pipe design assistance software - Sewerage facility data-base 2. Training Training in Japan - Local government implementing sewerage projects in Japan - Japan Sewage Works agency (JS) 3. Machinery and Equipment - Procurement of training facilities and equipment as defined in consideration of activity 3-5 4. Local Cost - Expenses necessary for personnel of secretary and translator - Expenses necessary for contract of local consultant (basic survey) - Expenses necessary for accommodation of JICA experts' activities - Expenses necessary for hiring local staff - Expenses necessary for procurement of equipment served for pilot activities.	1. Counterpart staff - Sufficient number of Counterpart staff (1) Ministry of Construction (MOC) - Member of Project Management Unit (PMU), including Project Director - One full time counterpart - Two part-time counterparts (officials of Drainage & Sewerage and Wastewater Treatment Management Division of ATI) (2) College of Urban Works Construction (CUWC) - Deputy Project Director / Project Manager - Responsible official(s) of training - Staff(s) in charge of training - Staff(s) in charge of management of training curriculum and trainers - Lecturers 2. Facilities (MOC, CUWC) - One project office with necessary furniture, air-conditioners, internet facility, etc. 3. Counter budget - Salaries and allowances for the Vietnamese counterpart staffs - Costs for O&M of equipment provided by the Japanese side - Travel, communication and other expenses for Vietnamese trainers	The inputs from the Vietnamese side such as personnel and budget are procured and ensured. - Ensure the attribution of counterpart after the establishment of organization to implement training in the field of sewerage - Ensure the budget from Vietnamese side - Cooperation of Vietnamese side for assuring participants in training courses  <Issues and countermeasures>

*1: Basic trainings consist of planning course and design course.

添付資料 B

モニタリングシート

TO CR of JICA Vietnam OFFICE**PROJECT MONITORING SHEET**

**Project Title : Project for Enhancing Management Capacity of Sewerage Works
In the Socialist Republic of Vietnam**

Version of the Sheet: Ver.03 (Term: 1st July 2018 – 10th December 2018)

Name: Dr. Mai Thi Lien Huong

Title: Director General of ATI

Name: Tamaki MORI

Title: JICA Long-term Expert

Submission Date: 10, December 2018

I. Summary**1. Progress****1-1 Progress of Inputs****(1) Input from Japanese side****1) Experts**

1) Long-term Experts		
1	Mr. WAKABAYASHI Junji	Sub Chief Advisor
2	Mr. MORI Tamaki	Training Expert / Project Coordinator
2) Consultant		
1	Mr. KAJIURA Takeki	Team Leader / Sewerage Works Planning
2	Mr. SASAKI Masaya	Deputy Team Leader / Development of Local Human Resources
3	Ms. KAMATA Hiroko	Planning of Training Courses
4	Mr. KAWAI Takehiko	Planning of Training Courses
5	Mr. ISHII Kenichi	Sewerage Project Implementation Support
6	Mr. TAKAMURA Yoshihiro	Research and Development
7	Mr. NISHIMAKI Hiroshi	Formulation of Financial Mechanism
8	Mr. UEDA Tatsuhiro	Training of Trainer
9	Ms. TABATA Satomi	Support of Preparation and Implementation of Training
10	Mr. YANAMOTO Satoshi	Support of Preparation of Textbook
11	Mr. MORI Isao	Development Planning of Training Facilities and Equipment

2) Counterpart Training

- Training in Japan will be implemented from 9th January to 19th January 2019.

3) Machinery and Equipment

- Equipment for training will be installed according to Action plan which has been prepared and explained from later November. Please refer the below list of proposed exhibits

List of Proposed Exhibits

No.	Name of technology / product	Supplier
1	Sewer network database system (COMPAS II) and Pipe design supporting system (PDP)	Tamano Consultants Co., Ltd. Pipe Design Inc.
2	Pre-treated Trickling Filter System	Meta Water Co., Ltd.
3	Pipe Jacking System	Iseki Poly-Tech, Inc. supported by Haiphong JSC.
4	Equipment of house connection and tertiary sewer with use of Vinyl-chloride Small Manhole and Pipe, and Material for Rainwater Harvesting	Sekisui Chemical Co., Ltd. (Vinyl-chloride material) TOTO Ltd. (Sanitary equipment)

4) Local Cost

- Necessary activities cost such as personnel of secretary and translator or other local staff has been utilized.
- Utility cost, furniture, and internet facilities for the Project office which was supposed to be provided by MOC based on PDM.

(2) Input from Vietnamese Side**1) Counterpart staff**

1) Ministry of Construction (MOC)		
1	Ms. Tran Thi Thao Huong	Head of Drainage & wastewater management Division
2	Mr. Nguyen Ngoc Duong	Deputy Head of Drainage & wastewater management Division
3	Mr. Bui Manh Dung	Full-time Counterpart
4	Mr. Do Manh Quan	Part-time Counterpart
5	Mr. Ngo Van Yen	Part-time Counterpart
2) College of Urban Works Construction (CUWC)		
1	Mr. Bui Hong Hue	Rector
2	Mr. Pham Thanh Dat	Director of CNEE
3	MS. Vu Thi Hoai An	Deputy Director of CNEE

2) Facilities

- MOC provided project office at No.71 Mai Hac De

1-2 Progress of Activities

- In the Detailed Planning Phase of the Project from January 2016 to March 2017, needs survey was conducted and needs for human resource development, project implementation support and Research and Development were identified. In the JCC held on 28th February 2017, JICA and MOC agreed to implement the activities related to three functions including the training, Project Implementation Support (hereinafter called PIS) and Research and Development (hereinafter called R&D) functions in the Implementation Phase of the Project from April 2017 to May 2019.
- In the Implementation Phase, Japanese side and Vietnamese side made an effort to implement the project activities based on the PDM, however, JICA and MOC agreed to discontinue the PIS and R&D functions and focus on the training function in collaboration with CUWC for the rest of the project duration as the following reasons.

- 1) Establishment of Vietnamese Sewerage Center (VSC) under ATI/MOC turned out to be impossible due to the limitation of new organizations under Vietnam's administration system.
 - 2) 1) has led the Project to focus on Training Function while activities related to two other functions (PIS and R&D) will narrow down toward its discontinuation.
- Accordingly, PDM was revised on JCC held in 15th June 2018, below project activities were approved by both sides.
 - As activities 1-1,1-2,1-3 were implemented in 2016, project team explains the progress of activities from 2-1 to 4-3 as followings,

1 Comprehensive needs of human resource development for sewerage sector

- The needs for three functions of VSC has been identified through reviewing of existing documents and data, interviewing some people's committees and questionnaire survey.

2-1 Draft of Structure and establishment plan of the organization

2-1-1 Collective analysis of existing organization structure

- Documents of establishment for CNEE and Hue project were provided as example by CUWC.

2-1-2 Preparation of draft structure of new organization

- Not started yet, the contents of activities are under discussion between both sides based on the action plan prepared by Japanese expert team.

2-1-3 Collective analysis of existing establishment plan

- Not started yet, the contents of activities are under discussion between both sides based on the action plan prepared by Japanese expert team.

2-1-4 Preparation of draft establishment plan

- Not started yet, the contents of activities are under discussion between both sides based on the action plan prepared by Japanese expert team.

2-2 Budget Plan for sustainable management of organization

2-2-1 Collective analysis of budget plan of existing organization

- Not started yet, but Japanese Expert Team is going to check the cost of the past pilot training courses and prepare a table of necessary cost of training course to be organized by CUWC after the project completion. Then CUWC will analyze the necessary cost of training course with use of the outcome of Japanese Expert Team.

2-2-2 Study on institutionalization of qualification system

- Not started yet but Japanese Expert Team is going to survey existing other related qualification system by using local consultants.

2-2-3 Preparation of draft budget plan

- Not started yet, the contents of activities are under discussion between both sides based on the action plan drafted by Japanese expert team.

2-3 Finalization of Structure and establishment plan of the organization

2-3-1 Confirmation of procedure of establishment

- Not started yet, the contents of activities are under discussion between both sides based on the action plan prepared by Japanese expert team.

2-3-2 Confirmation of willingness to establish

- CUWC has strongly willingness to establish a new center or department of training in the field of sewerage.

2-3-3 Achievement of establishment and continuous support

- Not started yet.

3-1 Setting up and Designing the effective training Curriculum

3-1-1 Stylizing of General Information

- Project team has made 5 General Information for Planning training. See each Training Report in detail.

3-1-2 Preparation of attendance list

- Project team has made 5 training attendance lists for Planning training. See each Training Report for in detail.

3-1-3 Preparation of plan document and manual of training

- In preparing stage, VSC training structure was made for implementing training.

3-1-4 Formulation of SNS network of trainees

- ATI Not yet started.

3-2 Preparing the training materials

3-2-1 Sewerage Planning Course

- Text book about the below has been developed and improved as each training course.
- Outline of sewerage works and structure of sewerage and drainage MP
- Basic planning of sewer network
- New Technology

3-2-2 Design Course

- The contents of training materials of design course was agreed discussion between CUWC and JICA Expert team based on the action plan prepared by Japanese expert team, the training materials are being prepared.
- The following subjects were agreed to be implemented in the design course.

1) Review of Planning course: Not yet started

2) Points to be checked in the design work of sewer not yet started

3) Selection of treatment method not yet started

4) Pipe design supporting system

5) Sewer database system

3-3 Identifying training programs and conducting the training courses

3-3-1 Implementation of Planning course (1st Hanoi, 2nd Hue, 3rd Nha Trang, 4th HCMC, 5th Can Tho)

- 5 times of training for Planning course were implemented and around 245 trainees from 63 cities/provinces attended the training courses.

3-3-2 Implementation of design course

- Not yet, the training program of design course is under discussion between CUWC and JICA Expert team.

3-3-3 Training of trainers

Training of CUWC members who are the candidates of lecturers

- Training of Trainer has been implemented since December 10th, 2018.

Training in Japan

- JICA and Vietnamese side agreed to implement the training in Japan from 9th to 19th January, 2019. JET proposed the schedule of training in Japan in October, 2018, then 7 trainees were selected by Vietnamese side in November, 2018. The application forms of all trainees were submitted to JICA Vietnam Office and JICA Tokyo Center approved the acceptances of these 7 trainees officially in December, 2018.

3-4 Reflecting the evaluation results of activity 3-3 to revise the training program

- In each pilot training course, questionnaire survey is implemented and satisfaction level and points to be improved are asked to trainees, trainers and organizers. Timetable, contents of training materials, subjects of training course and duration are modified based on the questionnaire survey.

3-5 Preparing the plan for training facilities and equipment

3-5-1 Preparation of the plan of development and procurement of equipment for training

- The contents of equipment were agreed between CUWC and Japanese Expert Team as follows, however, the specification of each equipment is under discussion.

Sekisui-Small type manhole

- Procurement has not started yet.
- As Japanese Expert Team proposed, finalization will be done after investigation of Sekisui factory and it's showroom on training in japan.

Metawater-PTF

- Procurement has not started yet.
- As Japanese Expert Team proposed, finalization will be done after investigation of PTF on training in japan.

ISEKI-Pipe jacking

- Procurement has not started yet.

Tamano Consultants-Sewer database system

- Computerized system has been installed in CUWC

Pipe Design-Pipe design supporting system

- Computerized system has been installed in CUWC

3-5-2 Preparation of the draft plan of experience-based training facility conducted by Pipe Design Pro (PDP)

and Data Base system

- The following work items (1. 2. 3.) have been implemented, the investigation of utilities in CUWC and collection of information about population and water consumption in CUWC were conducted by CUWC & Japanese expert team.

1. Basic survey (site survey, data collection)
2. Study on the basic planning frame
3. Layout plan of main facilities
4. Planning of sewer and drainage pipes
5. Planning of WWTP
6. Study on environmental impact
7. Financial planning
8. Final report

4-1 Selecting a city to develop Sewerage and drainage MP

- Nam Dinh was selected in 2017 by recommendation from ATI.

4-2 Support development of Sewerage and drainage MP in a specific city

- MP of Nam Dinh City was prepared together with ATI and Japanese Expert Team as pilot project.
- The MP was approved by the people's committee of Nam Dinh Province on 10th December, 2018.

4-3 Reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training

- The experience and knowledges derived from the study of sector MP of Nam Dinh City was reflected into the contents of pilot training courses held in July, October and December, 2018, a ATI counterpart made presentations in the three times pilot training courses.
- To utilize the experience and knowledges derived from the study of sector MP of Nam Dinh City effectively, the summary of the MP report will be prepared by Japanese Expert Team.

1-3 Achievement of Output

(1) Output 1: Comprehensive needs of human resource development for sewerage sector is identified.

Objectively Verifiable Indicators: Needs survey of human resource development is implemented.

Means of Verification: Needs survey reports

Achievement:

- Basic needs survey was implemented in 2016.
- Japanese Expert team implemented THE FACT-FINDING SURVEY ON EXAMPLES OF BEST PRACTICES OF HOUSE CONNECTION AND TERTIARY PIPES and held workshop in September 2018. This survey shows that three cities/province in the southern region of Vietnam have tried to overcome the difficulties in implementing the house connection work such as public relations

and other cities/provinces can utilize these efforts of three cities/province as authentic examples in order to improve polluted water environment successfully .

- Project is conducting analysis of questionnaire on training report of each course to understand the needs for training such as; provincial officials generally require comprehensive idea and broaden range of information or knowhow, which are necessary for political decision activities, instead of specialized technical expertise.

(2) Output 2: Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.

Objectively Verifiable Indicators: Structure and establishment plan of the organization to implement training in the field of sewerage are submitted.

Means of Verification: Structure and establishment plan of the organization to implement training in the field of sewerage

Achievement:

- An existing similar structure and establishment plans were collected.

(3) Output 3: The Basic trainings are implemented based on the comprehensive curriculums.

Objectively Verifiable Indicators:

- 1) Comprehensive training curriculums are formulated.
- 2) Training textbooks are prepared based on the training curriculums.
- 3) The number of times and participants for implemented training

Means of Verification: Training implementation report, training curriculum and training textbook

Achievement:

- Training curriculum consists of planning course and outline design course.
- Achievement of planning course is the followings,
 - 1) Comprehensive training curriculums were formulated for planning course and contents were explained in GI at each 5-training course.
 - 2) Training textbooks were prepared based on the training curriculums and presented them to all trainee for free of charge
 - 3) 5 times of training were implemented and total around 245 participants were attended from whole provinces and cities of above 3 class.

(4) Output 4: The experience and knowledges derived from development of sewerage and drainage Master Plan (MP) in a specific city is reflected to the contents of sewerage planning training.

Objectively Verifiable Indicators: Sewerage and drainage Master Plan (MP) in a specific city

Means of Verification: Information provision from a specific local city

Achievement:

- Same as 4-1, 4-2 and 4-3 of the Section 1-2.

1-4 Achievement of Project Purpose: MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.

Objectively Verifiable Indicators:

- Organization Structure to implement trainings (CUWC)
- Quality of contents for training

Means of Verification:

- Document about organization to implement trainings
- Survey on Training Implementation (i.e. Questionnaire to trainees)
- Financial document related to implement trainings
- Textbooks of trainings
- MOC and CUWC confirmed the basic conditions and issues to be tackled in the sewerage sector in Vietnam through the 5 times training courses held in the implementation phase of the project, however, the organization structure and financial solution to sustain the training function even after the project completion have not yet been prepared as of 10th December 2018.
- The Project should start developing Organization Structure to implement trainings by CUWC. Then it is necessary that CUWC should review implementation structure of training to enhance its management capacity.

1-5 Changes of Risks and Actions for Mitigation

(Not applicable for reporting period)

1-6 Progress of Actions undertaken by JICA

Training in Japan is scheduled in January, as described in 3-3-3 of Section 1-2.

1-7 Progress of Actions undertaken by Gov. of Vietnam

1-8 Progress of Environmental and Social Considerations (if applicable)

(Not applicable)

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

(Not applicable)

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- MOC/ATI will consider the introduction of budget system of training for provincial officers because necessity of proper M/P and F/S is governmental issue.

- Availability of certification system for officials and consultants who are in charge of Master Plan and F/S will be discussed by MOC/ATI, which will be introduced by Decision or Law to secure attendance for VSC training.

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- In the past two years, the Project spent most of the time for discussion of three functions etc. as highly controversial issue. Particularly in the first year series of discussions were conducted by both sides on the original plan aiming to establish VSC center with 3 functions (PIS, RD, Training). However, both sides could not develop a comprehensive and concrete plan.
- After JCC on 15th June, 2018, both sides agreed to revise the PDM and develop a new plan for training activity. Although the Planning Course was developed and has been implemented as planned, other new related activities including the training of trainer, formulation of SNS network of trainees, procurement of equipment for training and preparation of the draft plan of experienced-based training facility are proposed by action plan drafted in November 2018.
- The aforementioned coordination process led to substantial delay of the project activities. Limited remaining time may cause restriction on planned subsequent activities including certification system, tuition system, and additional pilot training to improve the quality and efficiency of training system more attractive and useful training system by using Project Cycle Management.

2-2 Cause

- As described in the 2-1

2-3 Action to be taken

- Vietnamese side will have clear Vision of sewerage training organizations for short and midterm.
- Implementation structure on RD will be revised to implement project activities more smoothly and efficiently. See “3-2 Other modifications on detailed implementation plan”
- Because of time constraints, the activities related to technical transfer and training of trainer have not been implemented enough. In order to improve this situation, both sides will carry out the Action Plan on schedule. Moreover, further discussion is required on the mid-term plan for CUWC to acquire experience necessary for continuous improving the quality of training.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of Vietnam,etc.)

JICA HQ, JICA office, Gov. of Vietnam, MOC, ATI, CUWC, Japanese Expert Team

3. Modification of the Project Implementation Plan

3-1 PO

- As described in the monitoring sheet 2 for revision of PO

3-2 Other modifications on detailed implementation plan

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA HDQs. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

- Implementation structure on RD will to be revised given the current status of the project and activities.

- **6. Implementation Structure**

The content of the implementation structure in the current RD is as follows:

The implementation structure shall be finalized by the end of the Detailed Planning phase. Tentative description is provided below.

The roles and assignments of relevant organizations are as follows:

(1) Responsible and Implementing Agency

MOC shall be the responsible agency of the Project. Administration of Technical Infrastructure (ATI) shall be the main implementing agency of the Project, responsible for coordinating other related agencies and stakeholders.

(2) Administration of Technical Infrastructure (ATI)

(a) Project Director/Director of Project Management Unit (PMU)

ATI Director General will be responsible for overall administration and implementation of the Project.

(b) Members of PMU

Sufficient number of staff of ATI, other departments of MOC and College of Urban Works Construction will be assigned as members of PMU.

(3) College of Urban Works Construction (CUWC)

Sufficient number of staff of CUWC will be assigned as members of PMU and as trainers of the training courses.

The proposed revision is as follows:

The implementation structure is provided below from January 2019.

The roles and assignments of relevant organizations are as follows:

(1) Responsible and Implementing Agency

MOC shall be the responsible agency of the Project. CUWC shall be the main implementing agency of the Project, responsible for coordinating other related agencies and stakeholders.

(2) Administration of Technical Infrastructure (ATI)

(a) Project Director/Director of Project Management Unit (PMU)

ATI Director General will be responsible for overall administration.

(b) Members of PMU

Sufficient number of staff of ATI, other departments of MOC and College of Urban Works Construction will be assigned as members of PMU.

(3) College of Urban Works Construction (CUWC)

(a) Project Vice Director and Project Manager

Rector of CUWC will be responsible for overall implementation of the Project as Project Vice Director and Project Manager

(b) Sufficient number of staff of CUWC will be assigned as members of PMU and as trainers of the training courses.

Other than the abovementioned, the following revisions are expected.

- Modification of Objectively verifiable indicators on Outputs 4
- Modification of Means of verification on Outputs 4

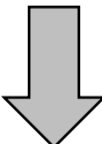
II. Project Monitoring Sheet I & II *as Attached*

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: Project for Enhancing Management Capacity of Sewerage Works in the Socialist Republic of Vietnam
 Implementing Agency: Ministry of Construction (MOC), Vietnam
 Target Group: MOC, College of Urban Civil Works (CUWC), Vietnam Water Supply and Sewerage Association (VWSA), Provincial People's Committees (PPCs) and Private Companies
 Period of Project: 3 Years and 4 Months from Feb. 2016 to May 2019
 Project Site: Overall Vietnam (Training will be implemented in Northern Vietnam, Central Vietnam, and Southern Vietnam.)

Version: 03

Dated; 10 December 2018

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievements	Remarks
Overall Goal					
To enhance the planning, implementation and management capacity of the sewerage sector to meet the future needs in Vietnam.	• The number of city implementing sewerage works (including the number of cities that have been developing sewerage and drainage master plan) increase.	• Reports from MOC and PPCs.			
Project Purpose					
MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.	• Organization Structure to implement trainings (CUWC) • Quality of contents for training	• Document about organization to implement trainings • Survey on Training Implementation (i.e. Questionnaire to trainees) • Financial document related to implement trainings • Textbooks of trainings	• The policies relating to sewerage sector management are not changed drastically even after the revision of the Sewerage Orientation.		
Outputs					
1. Comprehensive needs of human resource development for sewerage sector is identified.	• Needs survey of human resource development is implemented.	• Needs survey reports	• The institutional setups for the Project implementation are not changed drastically.		
2. Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.	• Structure and establishment plan of the organization to implement training in the field of sewerage are submitted.	• Structure and establishment plan of the organization to implement training in the field of sewerage			
3. The Basic trainings are implemented based on the comprehensive curriculums.	• Comprehensive training curriculums are formulated. • Training textbooks are prepared based on the training curriculums. • The number of times and participants for implemented training	• Training implementation report, training curriculum and training textbook			
4. The experience and knowledges derived from development of sewerage and drainage Master Plan (MP) in a specific city is reflected to the contents of sewerage planning training.	• Sewerage and drainage Master Plan (MP) in a specific city	• Information provision from a specific local city			
Inputs					
Activities		The Japanese Side	The Vietnamese Side	Pre-Conditions	
1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development, organize survey and identify needs on training 1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects). 1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects. 2-1 Based on Activity 1, structure and establishment plan of the organization to implement training in the field of sewerage are drafted by referring to the Japan Sewage Works Agency and Japan Sewage Works Association. 2-2 Based on 2-1, budget Plan for sustainable management of organization to implement trainings (including tuition collection from trainees and subsidy) are drafted. 2-3 Based on activities 2-1 and 2-2, structure and establishment plan of the organization to implement training in the field of sewerage are finalized and submitted to the competent authority. 3-1 Setting up and Designing the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works. 3-2 Preparing the training materials in English and Vietnamese as trial basis. 3-3 Identifying training programs based on targeted participants, and conducting the basic training courses for planning, implementation and management. 3-4 Reflecting the evaluation results of activity 3-3 to modify the training program. 3-5 Preparing the plan for training facilities and equipment. 4-1 Selecting a city to develop Sewerage and drainage MP 4-2 Support development of Sewerage and drainage MP in a specific city 4-3 Reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training * Activity 1, 2-1, 2-2, 3-1, 3-2, 3-3, 4-1 and 4-2 were conducted at the Detailed Planning Phase.	1. Experts Long-term Experts - Sub Chief Advisor (sewerage and drainage MP development) - Training Experts / Project Coordination Consultants - Basic survey - Organization / Establishment plan - Training (Training curriculum development, course material development, etc.) - Sewerage and drainage MP development assistance (Project identification, contract procedure, project management) 2. Training Training in Japan - Local government implementing sewerage projects in Japan - Japan Sewage Works Agency (JS) 3. Machinery and Equipment - Procurement of training facilities and equipment as defined in consideration of activity 3-5 4. Local Cost - Expenses necessary for personnel of secretary and translator - Expenses necessary for contract of local consultant (basic survey) - Expenses necessary for accommodation of JICA experts' activities - Expenses necessary for hiring local staff - Expenses necessary for procurement of equipment served for pilot activities.	1. Counterpart staff - Sufficient number of Counterpart staff (1) Ministry of Construction (MOC) - Member of Project Management Unit (PMU), including Project Director and Deputy Project Director - One full time counterpart - Two part-time counterparts (officials of Drainage & Sewerage and Wastewater Treatment Management Division of ATI) (2) College of Urban Works Construction (CUWC) - Project Manager - Responsible official of training - Staff in charge of training - Staff in charge of management of training curriculum and trainers - Lecturers 2. Facilities (MOC, CUWC) - Two project offices with necessary furniture, air-conditioners, internet facility, etc. 3. Counter budget - Salaries and allowances for the Vietnamese counterpart staffs - Costs for O&M of equipment provided by the Japanese side - Travel, communication and other expenses for Vietnamese trainers	The inputs from the Vietnamese side such as personnel and budget are procured and ensured. - Ensure the attribution of counterpart after the establishment of organization to implement training in the field of sewerage - Ensure the budget from Vietnamese side - Cooperation of Vietnamese side for assuring participants in training courses <div style="text-align: center;">  <Issues and countermeasures> </div>		

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 3

Dated 10th December 2018

Project Title: Project for Enhancing Management Capacity of Sewage Works

Inputs	Year	1st Year				2nd Year				3rd Year				4th		Remarks	Monitoring	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II		Issue	Solution
		Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual			
Expert																		
Consultants - Basic survey - Organization / Business plan																		
Chief Advisor (double as Sewerage Policy Advisor)																		
Sub Chief Advisor / Sewerage and drainage MP development																		
Sewerage Training Planning / Project Coordinator																		
Supporting Consultants (Training, Implementation Support, Research and Development)																		
Equipment																		
Training facilities and equipment in consideration of activity 3-5																		
Training in Japan																		
In-country/Third country Training																		

Activities	Year	1st Year				2nd Year				3rd Year				4th		Responsible Organization		Achievements	Issue & Countermeasures
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Japan	GOV		
		Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual				
Output 1: Comprehensive needs of Human resource development for sewerage works is identified.																			
1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development. Organize survey and identify needs on training.																JICA Expert Team (JET)	ATI-MOC		
1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects).																JET	ATI-MOC	Needs survey was implemented in 1st year (Detailed Planning Phase).	
1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects.																JET	ATI-MOC		
Output 2: Organization structure and Business plan for Sewerage Works Center are drafted.																			
2-1 Based on Activity 1, structure and establishment plan of the organization to implement training in the field of sewerage are drafted by referring to the Japan Sewage Works Agency and Japan Sewage Works Association.																JET	ATI-MOC CUWC	JET and CUWC started the discussion and CUWC showed their intent to utilize the existing department, CNEE as the implementing agency of training courses of sewerage sector.	From December, 2018 CUWC and JET will discuss additionally and prepare the necessary plan documents.
2-2 Based on 2-1, budget Plan for sustainable management of organization to implement trainings (including tuition collection from trainees and subsidy) are drafted.																JET	ATI-MOC CUWC	However, the Document about structure and budget plan have not yet been prepared.	
2-3 Based on activities 2-1 and 2-2, structure and establishment plan of the organization to implement training in the field of sewerage are finalized and submitted to the competent authority.																JET	ATI-MOC CUWC		
Output 3: Basic pilot training for sewerage works is implemented.																			
3-1 Setting up and Designing the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works.																JET	ATI-MOC CUWC	Carriculum for the training of planning course was prepared.	
3-2 Preparing the training materials in English and Vietnamese as trial basis.																JET	ATI-MOC CUWC	Training materials for sewerage planning course were prepared.	
3-3 Identifying training programs based on targeted participants, and conducting the basic training courses for planning and design, etc..																JET	ATI-MOC CUWC	6 times pilot training courses were organized until October, 2018.	
3-4 Reflecting the evaluation results of activity3-3 to modify the training program.																JET	ATI-MOC CUWC	The result of every training was reflected to next training.	
3-5 Preparing the plan for training facilities and equipment.																JET	ATI CUWC	JET is preparing the plan and discussing with CUWC.	

TO CR of JICA Vietnam OFFICE

PROJECT MONITORING SHEET

**Project Title : Project for Enhancing Management Capacity of Sewerage Works
In the Socialist Republic of Vietnam**

Version of the Sheet: Ver.04 (Term: 11th December 2018 – 31th May 2019)

Name: Dr. Mai Thi Lien Huong

Title: Director General of ATI

Name: Tamaki MORI

Title: JICA Long-term Expert

Submission Date: 10, June 2019

I. Summary

1. Progress

1-1 Progress of Inputs

(1) Input from Japanese side

1) Experts

1) Long-term Experts		
1	Mr. MORI Tamaki	Training Expert / Project Coordinator
2) Consultant		
1	Mr. KAJIURA Takeki	Team Leader / Sewerage Works Planning
2	Mr. SASAKI Masaya	Deputy Team Leader / Development of Local Human Resources
3	Ms. KAMATA Hiroko	Planning of Training Courses
4	Mr. KAWAI Takehiko	Planning of Training Courses
5	Ms. TABATA Satomi	Support of Preparation and Implementation of Training
6	Mr. YANAMOTO Satoshi	Support of Preparation of Textbook
7	Mr. MORI Isao	Development Planning of Training Facilities and Equipment

2) Counterpart Training

- Training in Japan was implemented from 9th January to 19th January 2019.

3) Machinery and Equipment

- Equipment for training were installed in CUWC as the following list.

List of Equipment for Training

No.	Equipment	Quantity	Supplier
1	Software of Sewer network database system (COMPAS II)	1	Tamano Consultants Co., Ltd.
2	Software of Pipe design supporting system (PDP)	1	Pipe Design Inc.
3	Software of Auto CAD	1	-
4	Software of Map Info	1	-
5	Desktop computer	1	-

6	Large-size monitor	1	-
7	Desk and chair	1	-
8	Laptop computer	10	-
9	Wi-Fi router	1	
10	Model of Pre-treated Trickling Filter System	1	Meta Water Co., Ltd.
11	Exhibit of house connection and tertiary sewer with use of Vinyl-chloride Small Manhole and Pipe	1	Sekisui Chemical Co., Ltd. (Vinyl-chloride material) TOTO Ltd. (Sanitary equipment)

4) Local Cost

- Personnel of secretary and translator or other local staff
- Utility cost, furniture, and internet facilities for the Project office which was supposed to be provided by MOC based on PDM.
- Expense for implementation of 8th pilot training course including printing cost, stationery cost and venue cost.

(2) Input from Vietnamese Side

1) Counterpart staff

1) Ministry of Construction (MOC)		
1	Ms. Tran Thi Thao Huong	Head of Drainage & wastewater management Division
2	Mr. Nguyen Ngoc Duong	Deputy Head of Drainage & wastewater management Division
3	Mr. Bui Manh Dung	Full-time Counterpart
4	Mr. Do Manh Quan	Part-time Counterpart
5	Mr. Ngo Van Yen	Part-time Counterpart
2) College of Urban Works Construction (CUWC)		
1	Mr. Bui Hong Hue	Rector
2	Mr. Pham Thanh Dat	Director of CNEE
3	Ms. Vu Thi Hoai An	Deputy Director of CNEE
4	Mr. Hoang Quoc Liem	Trainer from CUWC
5	Mr. Nguyen Cong Duc	Trainer from CUWC
6	Ms. Phan Thi Phuong	Trainer from CUWC

2) Facilities

- MOC provided a project office at No.71 Mai Hac De

1-2 Progress of Activities

- Action plan of the activities from November 2018 to May 2019 was approved by both sides at JCC held on 13 December 2018.
- Both sides discussed the necessity to extend the project period and work items to be implemented in the extended period as follows.
- The necessity to extend the project period;
 - The project has so far mainly focused on strengthening capacity for operation and management of sewerage facilities at province level. However, it turned out that appropriate planning and awareness of higher officials are indispensable for improvement of sewage management.

- Moreover, since its commencement, the Project spent considerable time for coordination and modification of the project framework in order to align with the policy changes and development in Vietnam.
- In this regard, extension of the project period is necessary for additional activities and thereby to ensure achievement of expected outcomes harmonized with the current situation of Vietnam.
- Work items to be implemented;
 - 1) Preparation for additional 2 times design training courses and one-time planning training course including revision of textbooks and additional trainings of trainers.
 - 2) Implementation of additional 2 times design training courses and one-time planning training course.
 - 3) Implementation of seminars targeting high-level officers for appropriate sewerage planning and management.
- Both sides confirmed to extend the project period until November 2019. The extension is officially approved on 22 May 2019 by signing the M/M for revision of the R/D.

Progress of activities implemented in the reporting period are described as follows.

1 Comprehensive needs of human resource development for sewerage works

1-1 To review the relevant sewerage sector report

- No activity was implemented in the reporting period.

1-2 To study issues on the stages from initial planning to O&M by visiting local governments

- No activity was implemented in the reporting period.

1-3 To forecast and identify the needs for human resource development

- No activity was implemented in the reporting period.

2 Structure and establishment plan of the organization to implement training in the field of sewerage

2-1 Draft of Structure and establishment plan of the organization

- Japanese Expert Team implemented the survey on the conditions of existing training courses conducted by various kinds of organizations in Vietnam, MOC's policy for human resource development and the existing qualification system in Vietnam from December 2018 to March 2019.

2-2 Budget Plan for sustainable management of organization

- Japanese Expert Team confirmed the current condition of the budget of CNEE/CUWC from February to March 2019.

2-3 Finalization of Structure and establishment plan of the organization

- Japanese Expert Team drafted the proposal on establishment of training for sustainable training implementation in sewerage sector of Vietnam in April 2019.
- However, this proposal has not yet been confirmed by Vietnamese side. Therefore, Japanese side will explain this proposal to Vietnamese side and both sides will discuss in the next period.

3 Basic trainings**3-1 To set up and design the effective training Curriculum**

3-1-1 To Stylize of General Information

- Project team has updated a General Information for the design training course in March 2019.

3-1-2 Preparation of attendance list

- Project team has developed a training attendance lists for design training course in March 2019.

3-1-3 Preparation of plan document and manual of training

- In preparing stage, VSC training structure was finalized as a plan for implementing training. Based on the plan, the design training course was implemented in March 2019.

3-2 To prepare the training materials

3-2-1 Sewerage Planning Course

- No activity was implemented in the reporting period.

3-2-2 Design Course

- Textbook for the following subjects has been finalized.

1) Challenge and solution for appropriate sewerage system in Vietnam

2) Points to be checked in the design work of sewer

3) Pipe design supporting system

4) Sewer database system

3-3 To identify training programs and conducting the training courses

3-3-1 Implementation of Planning course (1st Hanoi, 2nd Hue, 3rd Nha Trang, 4th HCMC, 5th Can Tho)

- No activity was implemented in the reporting period.

3-3-2 Implementation of design course

- A training for design course was implemented in CUWC from 26 to 28 March 2019 and 20 trainees from 5 consultant firms and the project management unit of Hanoi City attended the training course, in which tuition fee was charged.
- Training report of the design training course was developed and shared with JICA, ATI and UWC in April 2019.

3-3-3 Training of trainers

Training of CUWC members who are the candidates of lecturers

- Training of Trainer was implemented from December 2018 to March 2019 as described below.

Subject	Person in charge	
	Vietnamese side	Japanese side
Challenge and solution for appropriate sewerage system in Vietnam	Dat (CUWC)	Kamata
Points to be checked in the design work of sewer	An (CUWC)	Kajiura
Pipe design supporting system	Liem (CUWC)	Oura
Sewer database system	Duc, Phuong (CUWC)	Isao Mori

- As a result of trainings of trainers, these trainers could understand the contents of their target subjects and implement the design training course smoothly.

Training in Japan

- Training in Japan was implemented from 9th January to 19th January 2019 as scheduled.
- The outlines of the training in Japan are as follows.

(1) Objective

Extending the knowledge of management personnel and trainers of training facility to contribute to expand the sewerage system in Vietnam

(2) Major Training Items

- 1) Studying the example of house connection, which is one of the most important part of sewerage system
- 2) Studying the usage example of sewer network database system, which is essential for the appropriate development and operation of sewerage system
- 3) Viewing the Japanese technologies and products to be utilized for materials of future training courses
- 4) Visit of actual training centers of Japan Sewage Works Agency and the Bureau of Tokyo Metropolitan Government
- 5) Preparing the action plan to utilize trainees' future activities based on the experiences of training in Japan

(3) Participants

No.	Name	Organization
1	Ms. Tran Thi Thao Huong	Head of Sewerage division of Administration of Technical Infrastructure, Ministry of Construction (MOC)
2	Ms. Do Thi Hong Mai	Official, Department of Personnel and organization, MOC
3	Mr. Nguyen Thanh Phong	Deputy head of Water supply and sewerage Faculty, Architecture University
4	Mr. Bui Hong Hue	Rector of College of Urban Works Construction (CUWC)
5	Ms. Vu Thi Hoai An	Deputy director of Training Center for Water & Environment Sector (CNEE), Deputy head of technical infrastructure of CUWC
6	Mr. Pham Thanh Dat	Director of CNEE, CUWC
7	Mr. Chau Ngo Anh Nhan	Director of Khanh Hoa Development Project Management Unit (KDPM)

(4) Training Program

Date	Time	Contents	Accommodation
Jan. 9	PM	Flight to Japan (Hanoi --> Tokyo-Haneda)	Tokyo
		Move to TIC from Haneda airport	

PM Form 3-1 Monitoring Sheet Summary

Jan. 10	AM	Briefing by TIC	Takasaki
	PM	Orientation of training course in TIC	
		Move (TIC --> Sunamachi STP of Tokyo metro.)	
		Training center of the Breau of Sewerage in Tokyo metro.	
		Move (Tokyo --> Takasaki City)	
Jan. 11	AM	Move (Hotel --> Takasaki City Office)	Tokyo
	10am – 15pm	Takasaki City Office (Learning of sewerage design and database system)	
	PM	Move (Takasaki City --> TIC)	
Jan. 12		Holiday (Tokyo)	
Jan. 13		Holiday (Tokyo)	
Jan, 14	AM	Trainees' discussion to prepare the future action plan	Nagoya
	PM	Move (TIC --> Tokyo Station)	
		Move (Tokyo --> Nagoya)	
		Move (Nagoya Station --> JICA Chubu)	
Jan. 15	AM	Move (JICA Chubu --> Nagoya City Office)	Kyoto
	9am – 15pm	Site visit in Nagoya (Rainwater retention facility, etc.)	
	15pm – 17pm	Move (in Nagoya)	
		HQ of Tamano Consultant (Introduction of sewer database system)	
		Move to Nagoya station	
17pm –	Move (Nagoya --> Kyoto)		
		Move (Kyoto station --> Hotel)	
Jan. 16	AM	Move (Hotel --> Otsu City)	Okayama
		Site visit in Otsu (House connection, sewer database system)	
	PM	Move (Otsu --> Ritto City)	
		Factory of Sekisui Company	
		Move (Ritto City --> Okayama City)	
Jan. 17	AM	Move (Hotel --> Okayama Station)	Tokyo
		Move (Okayama --> Kochi)	
	PM	Move (Kochi Station --> Kochi City Office --> Site)	
		Site in Kochi (STP (PTF method), house connection)	
		Move (Kochi City --> Kochi airport)	
		Flight (Kochi --> Tokyo-Haneda)	
		Move (Haneda airport --> TIC)	
Jan. 18	AM	Move (TIC --> Toda City)	Tokyo

		Training center of Japan Sewage Works Agency	
		Move (Toda City --> TIC)	
	PM	Preparation and presentation of future action plan in TIC	
		Wrap-up and closing ceremony	
Jan. 19	AM	Move (TIC --> Haneda airport)	-
		Flight to Vietnam (Tokyo-Haneda --> Hanoi)	

3-4 To reflect the evaluation results of activity 3-3 to revise the training program

- In the design training course held from 26 to 28 March 2019, questionnaire survey was implemented and satisfaction level and points to be improved were asked to trainees, trainers and organizers. Based on the questionnaire survey, Japanese Expert Team and CUWC considered that laptop computers will be used for the subject of sewer database system as well as the subject of pipe design supporting system so that trainees can get more understanding of the training content.

3-5 To prepare the plan for training facilities and equipment

3-5-1 Preparation of the plan of development and procurement of equipment for training

- The following equipment were installed in CUWC and the method of operating of each equipment were instructed.

No.	Equipment	Time of installation
1	Exhibit of house connection and tertiary sewer with use of Vinyl-chloride Small Manhole and Pipe	May 2019
2	Model of Pre-treated Trickling Filter System	April 2019
3	Software of sewer network database system	December 2018
4	Software of pipe design supporting system	December 2018
5	Laptop computers to be used in training courses	February 2019

3-5-2 Preparation of the draft plan of experience-based training facility conducted by Pipe Design Pro (PDP) and Data Base system

- The following work items (1 - 7) were implemented, and the outcomes are compiled in the draft final report (DFR). The work item 8) will be implemented after CUWC confirms the DFR report in June 2019.

- 1) Basic survey (site survey, data collection)
- 2) Study on the basic planning frame
- 3) Layout plan of main facilities
- 4) Planning of sewer and drainage pipes
- 5) Planning of WWTP
- 6) Study on environmental impact

7) Financial planning

8) Final report

3-6 To formulate SNS network of trainees

- Facebook page of VSC training course was prepared by CUWC.

3-7 To conduct seminars for appropriate sewerage planning and management

- The seminar will be implemented in July and October 2019.

4 Sewerage and drainage master plan (MP) in a specific city

4-1 To select a city to develop Sewerage and drainage MP

- No activity was implemented in the reporting period.

4-2 To support development of Sewerage and drainage MP in a specific city

- No activity was implemented in the reporting period.

4-3 To reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training

- No activity was implemented in the reporting period.

1-3 Achievement of Output

(1) Output 1: Comprehensive needs of human resource development for sewerage sector is identified.

Objectively Verifiable Indicators: Needs survey of human resource development is implemented.

Means of Verification: Needs survey reports

Achievement:

- Basic needs survey was implemented in 2016.
- Japanese Expert team implemented THE FACT-FINDING SURVEY ON EXAMPLES OF BEST PRACTICES OF HOUSE CONNECTION AND TERTIARY PIPES and held workshop in September 2018. This survey shows that three cities/province in the southern region of Vietnam have tried to overcome the difficulties in implementing the house connection work such as public relations and other cities/provinces can utilize these efforts of three cities/province as authentic examples in order to improve polluted water environment successfully. Based on this fact-finding survey, both sides decided these issues and resolutions will be focused in the next training courses.
- Japanese Expert Team conducted analysis of questionnaire on training report of each course after the training course to understand the needs for training such as; provincial officials generally require comprehensive idea and broaden range of information or knowhow, which are necessary for political decision activities, instead of specialized technical expertise.

(2) Output 2: Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.

Objectively Verifiable Indicators: Structure and establishment plan of the organization to implement training in the field of sewerage are submitted.

Means of Verification: Structure and establishment plan of the organization to implement training in the field of sewerage

Achievement:

- The proposal on sustainable training organization in sewerage sector of Vietnam was drafted by JICA Expert Team.

(3) Output 3: The Basic trainings are implemented based on the comprehensive curriculums.

Objectively Verifiable Indicators:

- 1) Comprehensive training curriculums and textbook for each basic training course are developed.
- 2) Each basic training course is conducted at least three times (North, Center, South)

Means of Verification: Training implementation report, comprehensive training curriculum and training textbook

Achievement:

- Training implementation report for each training course was prepared.
- Training curriculum consists of planning course and design course.
- Achievement of planning course and design course are the followings,
 - 1) Comprehensive training curriculums were finalized for planning course and design course and contents were explained in GI at each training course.
 - 2) Training textbooks were prepared based on the training curriculums.
 - 3) 6 times of training were implemented and total around 265 participants were attended from whole provinces and cities of above 3 class.

(4) Output 4: Sewerage and drainage master plan (MP) in a specific city is developed and the experience through the development of the MP is shared / reflected in the basic trainings.

Objectively Verifiable Indicators:

- 1) Approval of the sewerage and drainage master plan (MP) in a specific city
- 2) Contents of the basic trainings reflecting the experience through development of MP

Achievement: The following activities have been implemented until the previous period.

- The MP was approved by the people's committee of Nam Dinh Province on 10th December 2018.
- The experience and knowledge derived from the study of sector MP of Nam Dinh City was reflected into the contents of pilot training courses held in July, October and December 2018, a ATI counterpart made presentations in the three times pilot training courses.

1-4 Achievement of Project Purpose: MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.

Objectively Verifiable Indicators:

- Organization Structure to implement trainings (CUWC)

- Quality of contents for training

Means of Verification:

- Document about organization to implement trainings
- Survey on Training Implementation (i.e. Questionnaire to trainees)
- Financial document related to implement trainings
- Textbooks of trainings
- Both sides confirmed the basic conditions and issues to be tackled in the sewerage sector in Vietnam through the 6 times training courses held in the implementation phase of the project, then both sides decided these issues and resolutions will be focused in the next training courses.
- Additionally, Japanese Expert Team drafted the proposal on sustainable training organization in sewerage sector of Vietnam in April 2019, however, this proposal has not yet been confirmed by Vietnamese side. Therefore, Japanese side will explain this proposal to Vietnamese side and both sides will discuss in the next period.

1-5 Changes of Risks and Actions for Mitigation

(Not applicable for reporting period)

1-6 Progress of Actions undertaken by JICA

Training in Japan was implemented in January 2019, as described in 3-3-3 of Section 1-2.

1-7 Progress of Actions undertaken by Gov. of Vietnam

(Not applicable for reporting period)

1-8 Progress of Environmental and Social Considerations (if applicable)

(Not applicable for reporting period)

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

(Not applicable for reporting period)

1-10 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

(Not applicable for reporting period)

2. Delay of Work Schedule and/or Problems (if any)

2-1 Detail

- From the beginning of the Project to June 2018, the Project spent most of the time for discussion to establish VSC center with 3 functions. After JCC on 15 June 2018, both sides agreed to focus on the training function.
- Action plan of the activities from November 2018 to May 2019 was drafted in November 2018 and approved by both sides on JCC held on 13 December 2018.
- Based on the action plan, project activities have been implemented until May 2019, however several work items of project activities has not yet been completed as of the end of May 2019, which include the explanation of the proposal on sustainable training organization in sewerage sector of Vietnam as described in 2-3 of Section 1-2 and the explanation of DFR of draft plan of experience-based training facility as described in 3-5 of Section 1-2.

2-2 Cause

- As described in the 2-1

2-3 Action to be taken

- Vietnamese side will have clear Vision of sewerage training organizations for short and midterm.
- Implementation structure on RD was revised to implement project activities more smoothly and efficiently. See “3-2 Other modifications on detailed implementation plan”
- Under the revised implementation structure, CUWC is expected to conduct the additional training activities independently in considering the sustainability after the project, and ATI is expected to support the training function more strongly as the administration organization of sewerage project in Vietnam.
- The following work items has not yet been completed as of the end of May 2018, therefore, these activities will be implemented in the extended period.
 - 1) Explanation of the proposal on sustainable training organization in sewerage sector of Vietnam
 - 2) Explanation of DFR of draft plan of experience-based training facility and finalize the FR
- Additionally, the following work items will be implemented in the extended period.
 - 1) Implementation of additional design training courses (twice) and planning training course (once) including preparation works such as revision of textbooks and additional trainings of trainers.
 - 2) Implementation of seminars targeting high-level officers for appropriate sewerage planning and management.

2-4 Roles of Responsible Persons/Organization (JICA, Gov. of Vietnam,etc.)

JICA HQ, JICA office, Gov. of Vietnam, MOC, ATI, CUWC, Japanese Expert Team

3. Modification of the Project Implementation Plan

3-1 PO

- As described in the monitoring sheet 2 for revision of PO

3-2 Other modifications on detailed implementation plan

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA HDQs. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

- Amendment of R/D including PDM and P/O was approved by both JICA and MOC on 22th May 2019, which reflects the change of implementation structure of Vietnamese side and the extension of project period.
- The updated implementation structure of Vietnamese side is as below.
 - (1) Ministry of Construction (MOC)
 - Member of Project Management Unit (PMU), including Project Director and Deputy Project Director
 - One full time counterpart
 - Two part-time counterparts (officials of Drainage & Sewerage and Wastewater Treatment Management Division of ATI)
 - (2) College of Urban Works Construction (CUWC)
 - Project Manager
 - Responsible official of training
 - Staff in charge of training
 - Staff in charge of management of training curriculum and trainers
 - Lecturers
- The updated project period is 3 Years and 10 Months from Feb. 2016 to Nov 2019.

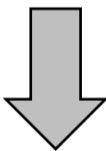
II. Project Monitoring Sheet I & II *as Attached*

Project Design Matrix

Project Title: Project for Enhancing Management Capacity of Sewerage Works in the Socialist Republic of Vietnam
 Implementing Agency: Ministry of Construction (MOC), Vietnam
 Target Group: MOC, College of Urban Civil Works (CUWC), Vietnam Water Supply and Sewerage Association (VWSA), Provincial People's Committees (PPCs) and Private Companies
 Period of Project: 3 Years and 10 Months from Feb. 2016 to Nov 2019
 Project Site: Overall Vietnam (Training will be implemented in Northern Vietnam, Central Vietnam, and Southern Vietnam.)

Version: 04

Dated; 10 June 2019

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal			
To enhance the planning, implementation and management capacity of the sewerage sector to meet the future needs in Vietnam.	<ul style="list-style-type: none"> The number of city implementing sewerage works (including the number of cities that have been developing sewerage and drainage master plan) increase. 	<ul style="list-style-type: none"> Reports from MOC and PPCs. 	
Project Purpose			
MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced.	<ul style="list-style-type: none"> Organization Structure to implement trainings (CUWC) Quality of contents for training 	<ul style="list-style-type: none"> Document about organization to implement trainings Survey on Training Implementation (i.e. Questionnaire to trainees) Financial document related to implement trainings Textbooks of trainings 	<ul style="list-style-type: none"> The policies relating to sewerage sector management are not changed drastically even after the revision of the Sewerage Orientation.
Outputs			
1. Comprehensive needs of human resource development for sewerage sector is identified.	<ul style="list-style-type: none"> Needs survey of human resource development is implemented. 	<ul style="list-style-type: none"> Needs survey reports 	<ul style="list-style-type: none"> The institutional setups for the Project implementation are not changed drastically.
2. Structure and establishment plan of the organization to implement training in the field of sewerage are drafted and submitted to competent authority.	<ul style="list-style-type: none"> Structure and establishment plan of the organization to implement training in the field of sewerage are submitted. 	<ul style="list-style-type: none"> Structure and establishment plan of the organization to implement training in the field of sewerage 	
3. The Basic trainings are implemented based on the comprehensive curriculum. *1	<ul style="list-style-type: none"> Comprehensive training curriculum and textbook for each basic training course are developed. Each basic training course is conducted at least three times (North, Center, South) 	<ul style="list-style-type: none"> Training implementation report Comprehensive training curriculum Training textbook 	
4. Sewerage and drainage Master Plan (MP) in a specific city is developed and the experience through the development of the MP is shared / reflected in the basic trainings.	<ul style="list-style-type: none"> Approval of the sewerage and drainage Master Plan (MP) in a specific city Contents of the basic trainings reflecting the experience through development of MP 	<ul style="list-style-type: none"> Information provision from a specific local city 	
Activities	Inputs		Pre-Conditions
	The Japanese Side	The Vietnamese Side	
<p>1-1 Review the relevant sewerage sector reports from the past to the present and study implementing organization and develop overall strategy for sewerage field works development, organize survey and identify needs on training</p> <p>1-2 Study the issues and implementation setup on the stages from initial planning to O&M and identify the needs for human resource development, project implementation support and Research and Development on Sewerage Works by visiting local governments which are currently implementing sewerage projects (such as yen loan projects).</p> <p>1-3 To forecast and identify the needs for human resource development, project implementation support and Research and Development and study the current situation of human resources of sewerage works by visiting local governments which have prospective sewerage projects.</p> <p>2-1 Based on Activity 1, structure and establishment plan of the organization to implement training in the field of sewerage are drafted by referring to the Japan Sewerage Works Agency and Japan Sewerage Works Association.</p> <p>2-2 Based on 2-1, budget Plan for sustainable management of organization to implement trainings (including tuition collection from trainees and subsidy) are drafted.</p> <p>2-3 Based on activities 2-1 and 2-2, structure and establishment plan of the organization to implement training in the field of sewerage are finalized and submitted to the competent authority.</p> <p>3-1 To set up and design the effective training Curriculum for human resource development by analyzing the results from activity 1 on the management capacity of sewerage works.</p> <p>3-2 To prepare the training materials in English and Vietnamese as trial basis.</p> <p>3-3 To identify training programs based on targeted participants, and to conduct the basic training courses for planning, implementation and management.</p> <p>3-4 To reflect the evaluation results of activity 3-3 to modify the training program.</p> <p>3-5 To prepare the plan for training facilities and equipment.</p> <p>3-6 To formulate SNS network of trainees.</p> <p>3-7 To conduct seminars for appropriate sewerage planning and management.</p> <p>4-1 To select a city to develop Sewerage and drainage MP</p> <p>4-2 To support development of Sewerage and drainage MP in a specific city</p> <p>4-3 To reflect experience and knowledges derived from development of sewerage and drainage MP into the contents of sewerage planning training</p> <p>* Activity 1, 2-1, 2-2, 3-1, 3-2, 3-3, 4-1 and 4-2 were conducted at the Detailed Planning Phase.</p>	<p>1. Experts Long-term Expert - Training / Project Coordination</p> <p>Short-term Experts - Basic survey - Organization / Establishment plan - Training (Training curriculum development, course material development, etc.) - Sewerage and drainage MP development assistance (Project identification, contract procedure, project management) - Pipe design assistance software - Sewerage facility data-base</p> <p>2. Training Training in Japan - Local government implementing sewerage projects in Japan - Japan Sewerage Works agency (JS)</p> <p>3. Machinery and Equipment - Procurement of training facilities and equipment as defined in consideration of activity 3-5</p> <p>4. Local Cost - Expenses necessary for personnel of secretary and translator - Expenses necessary for contract of local consultant (basic survey) - Expenses necessary for accommodation of JICA experts' activities - Expenses necessary for hiring local staff - Expenses necessary for procurement of equipment served for pilot activities.</p>	<p>1. Counterpart staff - Sufficient number of Counterpart staff (1) Ministry of Construction (MOC) - Member of Project Management Unit (PMU), including Project Director - One full time counterpart - Two part-time counterparts (officials of Drainage & Sewerage and Wastewater Treatment Management Division of ATI) (2) College of Urban Works Construction (CUWC) - Deputy Project Director / Project Manager - Responsible official(s) of training - Staff(s) in charge of training - Staff(s) in charge of management of training curriculum and trainers - Lecturers</p> <p>2. Facilities (MOC, CUWC) - One project office with necessary furniture, air-conditioners, internet facility, etc.</p> <p>3. Counter budget - Salaries and allowances for the Vietnamese counterpart staffs - Costs for O&M of equipment provided by the Japanese side - Travel, communication and other expenses for Vietnamese trainers</p>	<p>The inputs from the Vietnamese side such as personnel and budget are procured and ensured.</p> <p>- Ensure the attribution of counterpart after the establishment of organization to implement training in the field of sewerage</p> <p>- Ensure the budget from Vietnamese side</p> <p>- Cooperation of Vietnamese side for assuring participants in training courses</p> <p style="text-align: center;"></p> <p><Issues and countermeasures></p>

*1: Basic trainings consist of planning course and design course.

Project Title: Project for Enhancing Management Capacity of Sewage Works

Inputs table with columns for Year (1st, 2nd, 3rd, 4th), Quarter (I-IV), and Monitoring (Issue, Solution). Rows include Expert (Consultants, Chief Advisor, etc.) and Equipment.

Activities table with columns for Year, Quarter, Responsible Organization (Japan, GOV), Achievements, and Issue & Countermeasures. Rows include Output 1 (Human resource development), Output 2 (Organization structure), Output 3 (Basic pilot training), and Output 4 (Project implementation support).

Duration / Phasing table with columns for Year and Quarter, showing Plan and Actual progress.

Monitoring Plan table with columns for Year, Quarter, and Monitoring (Remarks, Issue, Solution). Rows include Monitoring (Joint Coordinating Committee, etc.) and Reports/Documents (Detailed Planning Survey Report, etc.).

添付資料 C

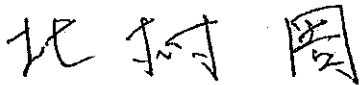
JCC の議事録

MINUTES OF MEETING
BETWEEN
MINISTRY OF CONSTRUCTION VIETNAM
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
FOR
THE 4TH JOINT COORDINATION COMMITTEE
ON
THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWAGE WORKS

Pursuant to the framework described in the Record of Discussion dated 16th October 2015 between the Ministry of Construction and the Japan International Cooperation Agency, the 4th Joint Coordination Committee meeting was held on 15th June 2018 in Hanoi.

In the course of the meeting, the Joint Coordination Committee (hereinafter is JCC) members reviewed and confirmed the project progress as well as discussed on the difficulties encountered and solutions. Detailed contents of the meeting are as attached hereto.

Hanoi, 15 June 2018



Mr. Shu Kitamura

Senior Representative
JICA Vietnam Office



Ass.Prof. Dr. Mai Thi Lien Huong

Director General
Administration of Technical Infrastructure
Minister of Construction

The 4th Joint Coordination Committee (JCC) meeting was co-chaired by Mr. Shu Kitamura, Senior Representative, JICA Vietnam Office, and MOC leader.

Time: 8:30 - 11:30 am.; Friday, 15th June 2018.

Venue: Movenpick hotel (83A Ly Thuong Kiet, Hoan Kiem, Hanoi)

Meeting agenda: Attachment 1.

Participants: Attachment 2 (comprising main counterparts and JICA experts).

Confirmed Documents:

- Revised Project Development Matrix (PDM): Attachment 3
- Revised Plan of Operation (PO): Attachment 4
- Monitoring Sheet: Attachment 5
- Project Implementation Structure (List of Vietnamese Counterparts and JICA Expert Team): Attachment 6

1. Objectives

Objectives of the 4th JCC meeting were following issues:

- (1) To review and confirm the project progress;
- (2) To discuss and confirm on adjustment of the project scope
- (3) To discuss and confirm the amendment of the project document (PDM, PO, and Monitoring Sheet).
- (4) To discuss and confirm on Project Implementation Structure (List of Vietnamese Counterparts and JICA Expert Team)

2. Contents and discussions

The JCC members emphasized four main contents in line with the meeting objectives.

(1) Confirmation of the project progress:

Prior to the discussion, a representative of ATI briefly summarized overall processes for one year and 3 months since 3rd JCC was held on 28th February 2017. Especially, the following circumstances were shared:

- 1) To establish Vietnam Sewerage Center (VSC) under ATI/MOC has not been possible due to the limitation of new organizations under Vietnam's administration system.
- 2) 1) has led the Project to focus on Training Function while activities related to two other functions (Project Implementation Support (hereafter, PIS) and

Research and Development (hereafter, R&D) will gradually narrow down toward its discontinuation.

After the presentation of the progress report and the future plan for the original 3 functions from both sides, JCC members reviewed and confirmed the progress of the project.

(2) Adjustment of the project scope

Considering the project progress so far, JCC members agreed to discontinue PIS and R&D functions and focus on the training function in collaboration with CUWC for the rest of the project duration.

The project purpose was revised to "MOC and CUWC's capacity to implement trainings in the field of sewerage is enhanced" instead of preparing the establish document for VSC.

Given the modification of the project purpose, each output was modified as follows:

Output 2:

Modified from "preparation of VSC establishment" into "preparation of organization structure and establishment plan to implement training in the field of sewerage under CUWC" since the establishment of VSC under ATI/MOC has become impossible.

Output 3:

Modified from "The Basic trainings are implemented" into "The Basic trainings are implemented based on the comprehensive curriculums" since the comprehensive curriculums are needed and have already been developed.

Output 4:

Modified from "Pilot activities for PIS function are implemented" into "The experience and knowledge derived from development of sewerage and drainage Master Plan (MP) in a specific city is reflected to the contents of sewerage planning training" since both sides agreed to utilize the experience and knowledge derived from PIS function into the training content, instead of continuing activities on PIS function individually.

Output 5:

Deleted due to discontinuation of activities on R&D function

(3) Amendment of the project document (PDM, PO, and Monitoring Sheet).

Along with discussion on adjustment of the project scope, JCC members agreed to modify PDM as attachment 3. In addition to modification of the project purpose and the project outputs, indicators, means of verification and inputs from both sides were revised. Especially, both sides agreed to implement training in Japan which mainly targets on training for trainers.

In line with modified PDM, PO was also revised as Attachment 4. Also, progress so far was summarized in the monitoring sheet as Attachment 5 and confirmed by JCC members.

(4) Confirmation on Project Implementation Structure (List of Vietnamese Counterparts and JICA Expert Team)

To clarify roles of each project member on each project output, JCC members confirmed Project Implementation Structure (List of Vietnamese Counterparts and JICA Expert Team) as Attachment 6

3. Others

After signing this Minutes of Meeting, JICA and the Vietnamese side will modify the Record of Discussion. The amendment of the Record of Discussion is expected to be signed in July 2018.

MINUTES OF MEETING
BETWEEN
MINISTRY OF CONSTRUCTION VIETNAM
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
FOR
THE 5TH JOINT COORDINATION COMMITTEE
ON
THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWAGE WORKS

Pursuant to the framework described in the Record of Discussion dated 16th October 2015 between the Ministry of Construction and the Japan International Cooperation Agency, the 5th Joint Coordination Committee meeting was held on 13th December 2018 in Hanoi.

In the course of the meeting, the Joint Coordination Committee (hereinafter is JCC) members reviewed and confirmed the project progress with monitoring report and project new work plan until the end of this project as well as discussed on the views with Vietnamese officials concerned.

Detailed contents of the meeting are as attached hereto.

Hanoi, 13th December 2018

Mr. Shu Kitamura

Senior Representative
JICA Vietnam Office

Assoc.Prof. Dr. Mai Thi Lien Huong

Director General
Administration of Technical Infrastructure
Minister of Construction

I. Introduction

The contents of the 5th JCC were:

- Confirmation of the work plan and action plan for the remaining project period
- Confirmation of the project progress based on the monitoring sheet
- Discussion on the way forward of the Project

II. Major Points Discussed

1. Work Plan and Action Plan for the remaining project period

- 1) Both sides agreed to focus on accomplishing the activities designed in the Work Plan and Action Plan and securing the sustainability of the Project.
- 2) JICA suggested Vietnamese side to consider the direction and priority in the remaining project period including which activities can be scaled up after the project and how to secure the sustainability of the Project.
- 3) CUWC confirmed to focus on two issues such as (1) equipment/facilities for training and lecturers and (2) training of trainers in the remaining project period.
- 4) It was discussed that among existing similar software for sewer design, PDP's advantage should be emphasized in the software introduction of the training in a sustainable manner.

2. Project Progress

- 1) The Vietnamese side suggested the extension of project period as a solution of delay considering the delay in the first year of the implementation phase, most of which was spent for the discussion on three functions.
- 2) JICA recommended focusing on achievement of the activities in the remaining period in accordance with the Work Plan and Action Plan.

3. Way Forward of the Project

- 1) The Vietnamese side expressed willingness to expand target trainees to all over Vietnam, therefore, ATI would continue to encourage local municipalities to participate in the training courses.
- 2) Since needs for training in Vietnam is various, programs and contents of the future training courses should reflect the comments from relevant bodies as well as training participants. Especially, the Vietnamese side raised concern on the importance of the flood control in the future training courses.
- 3) It was discussed that it is important to establish a training organization to ensure the sustainability of training function, which includes the incorporation into the existing organization.

III. Appendix List

Appendix 1: List of Major Attendants

Appendix 2: Agenda of 5th JCC

Appendix 1. List of Major Attendants

Vietnamese Counterparts		
1	Assoc. Prof. Dr. Mai Thi Lien Huong	Director General of ATI, MOC
2	Ms. Tran Thi Thao Huong	Vice Head of Sewerage and WWT Department-ATI
3	Dr. Bui Hong Hue	Rector of CUWC
4	Ms. Vu Thi Hoai An	Vice Dean of Urban Engineering Faculty, Vice Director of CNEE, CUWC
5	Mr. Do Manh Quan	Officer of Sewerage and WWT Department – ATI
6	Mr. Nguyen Van Yen	Officer of Sewerage and WWT Department – ATI
7	Mr. Bui Manh Dung	Full time counterpart of ATI for VSC
8	Ms. Pham Huong	Officer of Sewerage and WWT Department – ATI
9	Ms. Truong Thi Thanh Huong	Officer of Administrative Division – ATI
10		
JICA		
11	Ms. Shimodaira Chie	Senior Deputy Director of Environmental Management Group, Global Environment Department, JICA HQ
12	Mr. Kitamura Shu	Senior Representative of JICA Viet Nam
13	Ms. Kanto Yuko	Project Formulation Adviser, JICA Viet Nam
14	Mr. Hayashi Takaaki	Junior Advisor of Global Environment Department, JICA HQ
15	Mr. Nguyen Vu Tiep	Program Officer of JICA Viet Nam
16	Mr. Ibaraki Makoto	Sewerage Policy Adviser of JICA in MOC
17	Ms. Dao	JICA staff in MOC
JICA Expert Team		
18	Mr. Mori Tamaki	JICA long-term Expert
19	Ms. Đỗ Thị Nga	National Project Coordinator
20	Mr. Kajiura Takeki	Consultant Team Leader
21	Mr. Sasaki Masaya	Consultant Deputy Team Leader
22	Ms. Kamata Hiroko	Consultant Team Member
23	Mr. Mori Isao	Consultant Team Member
24	Ms. Tabata Satomi	Consultant Team Member
25	Ms. Đỗ Thanh Vân	Secretary of Consultant Team
26	Ms. Chu Diệu Hà	Translator of Consultant Team
27	Ms. Tô Thị Kim Phụng	Translator of Consultant Team
28	Trần Quang Trung	Local engineer of Consultant Team

Appendix 2. Agenda of 5th JCC

Date and Time	13th December (Thu.), 13:00 to 16:00
Venue	Movenpick Hotel
Chair	ATI director General

Agenda

12:30- 13:00	Registration by CUWC/JET and ATI
13:00- 13:10	Introduction of Participants
13:10- 13:20	Opening Remarks: Director General of ATI JICA office (Senior Representative)
13:20- 14:10	Explanation & Confirmation of Work Plan & Action Plan by Expert team - Demonstration of New technologies / Pipe Design Pro and Data-Base system for sewerage facilities - Questions and Answers
14:10-14:40	- Project progress report through Monitoring Sheet by CUWC - Overview Comments and project report by ATI
14:40-15:30	Way forward of project and Wrap-up Discussion and Confirmation - Wrap up comments / CUWC & ATI - Wrap up Comment / Ms. Shimodaira (Mission Leader of JICA HQ)
15:30-15:40	Closing Remark Project Director/ DG of ATI
	Tea/Coffee Time

MINUTES OF MEETING
BETWEEN
MINISTRY OF CONSTRUCTION VIETNAM
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
FOR
THE 6TH JOINT COORDINATION COMMITTEE
ON
THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWAGE WORKS

Pursuant to the framework described in the Record of Discussion dated 16th October 2015 between the Ministry of Construction and the Japan International Cooperation Agency, the 6th Joint Coordination Committee meeting was held on 13th November 2019 in Hanoi.

In the course of the meeting, the Joint Coordination Committee (hereinafter is JCC) members reviewed and confirmed the achievement of the project purpose and the prospects to achieve the overall goal of the Project.

Detailed contents of the meeting are as attached hereto.

Hanoi, 13th November 2019



Mr. Shu Kitamura

Senior Representative
JICA Vietnam Office



Assoc. Prof. Dr. Mai Thi Lien Huong

Director General
Administration of Technical Infrastructure
Minister of Construction



I. Introduction

The contents of the 6th JCC were:

- 1) Confirmation of the contents of the Project Completion Report (PCR) and the achievement of project purpose based on PDM
- 2) Confirmation of the action plan of CUWC's activities to be implemented after the project completion
- 3) Discussion on the way forward and wrap-up of the Project

II. Major Points Discussed

1. Contents of PCR and Achievement of project purpose

- 1) JICA Expert Team (JET) explained the contents of PCR and both sides confirmed the proceedings, achievements and lessons learnt from the Project.
- 2) The Both Sides reviewed the project progress, achieved target since agreement on reduction and modification of the project scope following JICA's requirement on letter No. 482.2018/JICA. IF dated 14th May 2018 attention to Minister of MOC. It is noted that, before coming to the agreement on reduction and modification of the two functions, the both sides have completed a part of PIS function, specifically the implementation of Nam Dinh sewerage and drainage master plan. Through the actual implementation, the reduction of these two functions named PIS and R&D has been compensated by addition of training courses which has met the actual demands from local governments in the whole country, securing the sustainability and sewerage coverage ratio beyond the initial target on quantity and quality.
- 3) JET expressed the expectations and recommendations to Vietnamese side to ensure sustainability of these training courses on planning and design, based on the experience and knowledge obtained from the Project.

2. Action Plan of CUWC's activities to be implemented after the project completion

- 1) Both sides confirmed the current situation and issues to be tackled of the existing sewerage systems in Vietnam.
- 2) CUWC presented their action plan to be implemented after the project completion. It includes a plan for integrating the training function of the field of sewerage, succeeding the name of VSC as well as some proposals and recommendations to achieve the overall goal of the Project.
- 3) CUWC is going to incorporate VSC training function into CNEE of CUWC (Training center for Water and Environment Sectors) by Rector Decision within 2019.

3. Way Forward of the Project

- 1) The Vietnamese side expressed their sincere appreciation for the support from Japanese side on the Project and indicated their continuous commitment to promote the importance of household connection to whole Vietnam including the aspects of institutional framework and human resource development. Especially for further strengthening capacity, training courses on sewerage planning and

design focusing on household connection will be continuously implemented by CUWC with the support of ATI.

- 2) The Japanese side expressed their sincere appreciation for all related organizations and persons and the expectations to Vietnamese side to achieve the overall goal and improve the water environment in Vietnam.

III. Appendix List

Appendix 1: List of Major Attendants

Appendix 2: Agenda of 6th JCC

Appendix 1. List of Major Attendants

Vietnamese Counterparts

1	Dr. Mai Thi Lien Huong	Director General of ATI, MOC
2	Ms. Do Nguyet Anh	International Cooperation Department, MOC
3	Mr. Nguyen Van Yen	Officer of Sewerage and WWT Department – ATI
4	Ms. Truong Thi Thanh Huong	Officer of Administrative Division – ATI
5	Dr. Bui Hong Hue	Rector of CUWC
6	Ms. Vu Thi Hoai An	Vice Dean of Urban Engineering Faculty, Vice Director of CNEE, CUWC
7	Mr. Nguyen Cong Duc	Deputy Head of Equipment and Facilities Management Office, CUWC

JICA

8	Ms. Shimodaira Chie	Senior Deputy Director of Environmental Management Group, Global Environment Department, JICA HQ
9	Mr. Kitamura Shu	Senior Representative of JICA Viet Nam
10	Ms. Kanto Yuko	Project Formulation Adviser, JICA Viet Nam
11	Ms. Dao To Cam	Program Officer of JICA Viet Nam
12	Mr. Ibaraki Makoto	Sewerage Policy Adviser of JICA in MOC
13	Ms. Nguyen Thi Dao	JICA staff in MOC

JICA Expert Team

14	Mr. Mori Tamaki	JICA long-term Expert
15	Ms. Đỗ Thị Nga	National Project Coordinator
16	Mr. Kajiura Takeki	Consultant Team Leader
17	Mr. Sasaki Masaya	Consultant Deputy Team Leader
18	Mr. Mori Isao	Consultant Team Member
19	Mr. Oura Hiroshi	Consultant Team Member
20	Ms. Đỗ Thanh Vân	Secretary of Consultant Team
21	Ms. Tô Thị Kim Phụng	Translator of Consultant Team
22	Trần Quang Trung	Local engineer of Consultant Team

Appendix 2. Agenda of 6th JCC

Date and Time	13th November (Wed.), 14:30 to 16:30
Venue	Hotel Melia Hanoi
Chair	ATI director General

Agenda

14:00 - 14:30	Registration by CUWC/JET and ATI
14:30 - 14:40	Introduction of Participants
14:40 - 14:50	Opening Remarks: Director General of ATI JICA office (Senior Representative)
14:50 - 15:10	Reporting of Contents of Project Completion Report <u>by Expert team</u> Basic information, results, achievements, lesson learnt etc. based on PDM
15:10 - 15:40	Reporting for achievement of overall goal after project completion <u>by CUWC</u> - Prospects to achieve overall goal - Plan of operation and implementation structure of Vietnamese side to achieve overall goal and recommendation
15:40 - 16:10	Way forward and Wrap-up of the Project Wrap up comments / ATI, CUWC and JICA long term expert Wrap up Comment / Ms. Shimodaira Chie (Mission Leader of JICA HQ)
16:10 - 16:20	Closing Remark Project Director/ DG of ATI

添付資料 D

持続可能な研修組織に 関する提案書

For College of Urban Works Construction (CUWC)

**Proposal on Sustainable Training
Organization in Sewerage Sector of
Vietnam**

April, 2019

JICA VSC Project Team

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1. Target of Sewerage/Drainage Development

Recent rapid urbanization along with economic growth and industrialization have caused severe environmental deterioration in Vietnam. Urban infrastructure such as road, electricity and water supply has been smoothly developing while development of sewerage systems does not catch up urbanization.

In Vietnam, based on the revised sewerage development policy (Prime Minister's Decision NO.589/QD-TTg dated April 2016), until 2025, sewerage service ratio should be 50% at urban area of Category V cities or above, and until 2050, sewerage service ratio should be 100% in all urban areas.

As of June 2018, there have been about 48 centralized wastewater treatment plants (hereinafter called WWTPs) operating in centers of urban areas of Category III and upwards. The total design capacity of these WWTPs are 960,000 m³/d, accounting for nearly 17% of the total urban domestic wastewater. To achieve this target, a lot of sewerage projects have to be implemented in whole Vietnam from now on.

Table 1.1 Target of Sewerage/Drainage Development

Items		2015	2020	2025	2050
Drainage (rain water discharge)	Flood	To be solved in category II or higher urban areas	To be solved in category IV or higher urban areas	To be solved in all urban areas	Will be solved in all urban areas
	Service coverage	70-80%	>80%	90-95%, 100% in category IV or higher urban areas	
Wastewater discharge	Service coverage of collection and treatment system	40-50% in category III or higher urban areas	60% in category III or higher urban areas	70-80% in category IV or higher urban areas	Will be solved in all urban areas
		-	40% in categories IV, V urban areas and craft villages	50% in category V urban areas and craft villages	
	Industrial and hospital wastewater	-	-	Wastewater treatment plants at different levels of management are located in craft villages	-
		The whole wastewater is treated All industrial parks have their own discharge system	-	-	-
Other items	Public toilets are installed in categories IV or higher urban areas	Pipes, sewers, channels will be upgraded to prevent pollution at concentrated residential areas	20-30% treated wastewater will be reused.	-	

Source: JICA 2011, Research Report on Vietnam Urban Environmental Management

2. Need for Enhancing the Capacity of Relevant Organization

2.1 Problems of Sewerage Sector in Vietnam

(1) Lack of Capacity of Planning and Implementation

During these 10 years, Vietnamese government has invested a lot of effort and finance on the sewerage and drainage sector. While most of development of sewerage systems in Vietnam have been financed by ODA from external donors including JICA, lack of number of expert personnel and capacity of planning and implementation in this field, especially in local provinces/cities, causes the delays in implementation of projects.

(2) Low Influent BOD and WWTP

The influent BOD into WWTP in the combined system is very low and usually 50-100 mg/l while the design standard is about 200 mg/l. The reason of low BOD is caused by no installation of tertiary sewer.

Usually the target of sewerage facilities financed by ODA is WWTP, pump station, interceptor/main pipe, and local government is responsible of remaining part such as installing the tertiary sewer. However, due to budget constraint in local government for allocating sewerage system, the progress of installing the tertiary sewer is very low. Since there is no tertiary sewer which the domestic wastewater flows into, the resident has to remain the septic tank even after WWTP starts operation. The effect of improving the quality of public water body is also limited, because the reduction load of BOD is not so big.

Decree No. 80/2014/ND-CP stipulates that central-run cities must prepare a separate drainage and sewerage plan to specify the drainage issues presented in the approved urban master plan. However, master plans of provinces and cities are still prepared following the traditional practice, not integrated and without clear and reliable orientations. Drainage, sewerage and sanitation have not been addressed satisfactorily in these plans. The preparation of such plans progresses very slowly due to budget shortage.

It is very important that relevant staff/organization will acquire the correct knowledge of the sewerage system and reflect it to the actual planning and design work.

(3) Requirement of Long Time Before Procurement of Contractor

Sewerage and drainage projects are quite new sector for most of the cities while these projects require a lot of expertise in various field to officials in local provinces/cities. JICA's experience in past ODA project shows that sewerage projects, usually implemented by PPC, took more than 5 years even before procurement of contractors while that in Energy and Transport sector, usually implemented by central PMU, took only around 3 years. The main reason seems to be the lack of experience in local provinces/cities. They lack experiences in not only sewerage and drainage projects, but also management in large scale projects which includes International competitive bidding (ICB). Therefore, the capability of proceeding the procedure is to be enhanced to smooth implementation.

2.2 Need for Enhancing the Capacity Development

JICA Expert Team conducted the needs survey targeting 39 cities for enhancement of management capacity in 2016. Most of the cities which responded the questionnaire understood the necessity of the training function. It is urgently required to develop human resource in sewerage sector in Vietnam to carry out sewerage projects which are expected to be spread throughout Vietnam.

The target personnel for human resource development is both public and private sectors and first target field is especially planning, design, followed by construction, and O&M. Without appropriate capacity development in target personnel and target field, it is concerned that the sewerage facilities after starting the operation will not contribute to improve water environment efficiently and effectively.

JICA started the technical assistant project “The project for enhancing management capacity of sewerage works” in 2016. In this project, two (2) training courses consisting of planning and preliminary design were implemented all over Vietnam in collaboration with CUWC/MOC as shown in Table 2.1.

Table 2.1 Implemented Training Courses in the JICA’s Technical Assistant Project

No.	1) Planning course						2) Preliminary design course		
	1-1	1-2	1-3	1-4	1-5	1-6	2-1	2-2	2-3
Year	2017	2018				2019	2019		
Date	23-27/10	10-13/4	10-12/7	10-12/10	4-6/12		26-28/3		
Term	5 days	5 days	3 days	3 days	3days		3 days		
Venue	Hanoi	Hue	Nha Trang	HCMC	Can Tho		Hanoi		
Number of participants	41	30	48	35	50		20		

Source: JICA Expert Team

The target organization of planning course was mainly People’s committee (hereinafter called PPC), Department of Construction (hereinafter called DOC), Department of Planning and Investment (hereinafter called DPI) and Project Management Unit (hereinafter called PMU) in provinces/cities, while that of preliminary design course was private company and PMU in Yen Loan project. The courses and curriculum were prepared through the collaboration works between Vietnamese lecturers and Japanese experts, based on Japanese training materials in consideration of Vietnamese current situation. The good practice and lesson learned in the Vietnamese case were also included in the textbook.

This project will be terminated in 2019 and CUWC/MOC will take over this function.

3. Current Conditions Related to Training Courses

3.1 Existing Training Courses Conducted by Various Kinds of Organizations

(1) Main Training Activity

At present, various kinds of organizations provide the training course in the construction field including sewerage sector as shown in Table 3.1. Among the four existing organizations, the training experience in CIRD is very limited.

Table 3.1 Name of Organization and Its Main Activity

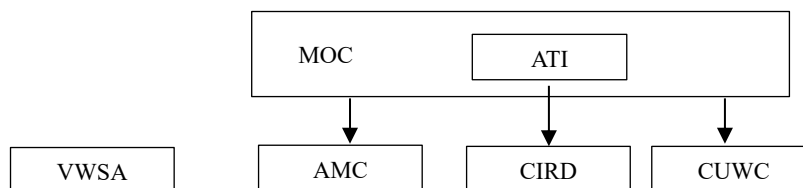
Name of organization	Main activity
Vietnam Water Supply and Sewerage Association (VWSA)	<ul style="list-style-type: none"> - Established in 1988, VWSA is a voluntary social - occupational organization of bodies and individuals engaged in the management, consultancy, scientific research, training, construction, exploitation and operation, manufacturing and trading of materials and equipment of the water supply and sewerage sector. - Total staff number is about 20, including 6 officials in Water Training Center. Some experts in IWASSE (Institute for Water Supply, Sewerage and Environment) - Its objectives are to gather and unite water members, support each other to operate effectively, contribute to the development of the water sector, improve the quality of life for social – economic development of the country.
Academy of Managers for Construction and	<ul style="list-style-type: none"> - Established in 1975, AMC is a governmental institution under MOC. - Its main functions are to organize training courses for officials of construction

Cities (AMC)	<p>industry, urban managers at all levels, and for those involving in construction activities and management, training courses on construction-related regulations as well.</p> <ul style="list-style-type: none"> - Besides, it conducts research and applies policies, advanced technology and managerial science to every aspect of the Ministry's management functions.
Center for Research and Development of Technical Infrastructure (CIRD)	<ul style="list-style-type: none"> - Established in 2014 as a non-business service unit under ATI, the function of CIRD is to advise and assist the Director of ATI; Infrastructure R&D (Policy, strategy etc.), Construction consultancy services (planning, formulation and verification, setting of criteria and cost norms etc.), Build specialized databases, Conduct experiments, analysis, tests, and verification of water quality, Training, Activities to improve professional skills, and propaganda of legal documents. The staff number is 15, including 2 officials who studied water in the University. - The experience of wastewater project is limited and some experience of proving training on construction, but very limited.
Training center for Water and Environment Sectors CNEE/CUWC	<ul style="list-style-type: none"> - CNEE of CUWC (College of Urban Works Construction) was established in 2004 by MOC. - The training courses are: water quality management; water treatment; O&M of water supply equipment; management of water distribution; water loss prevention; executing and installing water network; customer service; human resources development; and finance management.

Source: Website of each organization

(2) Regulatory Authority

VWSA is independent from MOC, while AMC and CUWC is under MOC and CIRD is under ATI/MOC.



Source: JICA Expert Team

Figure 3.1 Regulatory Authority in Relevant Organizations

(3) Training Type

Each organization adopts the different training type as shown in Table 3.2.

Table 3.2 Training Type Adopted in Each Organization

Type	Organization	Method
Ready made	VWSA, AMC	<ul style="list-style-type: none"> - They announce the training schedule, content, training fee and other necessary information in advance for recruiting the trainee through their website or paper.
Custom made	CIRD, CUWC	<ul style="list-style-type: none"> - They prepare the training course based on the requirement from the client. They contract with client with regard to contract amount, content, term, and another necessary item. - As for CUWC, if contract amount exceeds the actual expense, the difference between both becomes the benefit of CNEE. CNEE sends back this benefit to CUWC, which is used for the general activity of CUWC.

Source: JICA Expert Team

3.2 MOC's Policy for Human Resource Development

Public officers in Vietnam are requested to continue to enhance their professional knowledge and skills based on Decree 101/2017/ND-CP, dated 1/9/2017. JICA Expert Team had a meeting with the training division of operation and personnel department in MOC and studied the MOC's policy for human resource development as summarized below.

(1) Human Resource Development for MOC Officers

For the state management officers especially in infrastructure sectors, MOC prepares the annual training plan. MOC officers can attend the following two types of training courses.

- 1) Based on the Program No. 1961 related to urban development, MOC establishes the training curriculum and organizes the training course related to administrative management of infrastructure project. After the training course, trainee can receive a certificate, which is legal but not license and compulsory for their career.
- 2) Several training organizations including college and AMC establish the specific training programs and organize training courses related to management of construction project. MOC annually subsidizes a certain amount to these training organizations.

Not only state management officers but also officers of local governments can attend above-described training courses, if they pay the tuition fee.

(2) Human Resource Development for Local Governments

MOC annually subsidizes local governments for the capacity developments of their officers. Local governments can decide how to utilize these subsidies to enhance their capacities, which means they can select the most attractive training courses to be attended by their officers.

Additionally, if training organization including CUWC dispatches trainer to local area to conduct training course, MOC can subsidize the expense of business trip of trainer.

3.3 Existing Qualification System

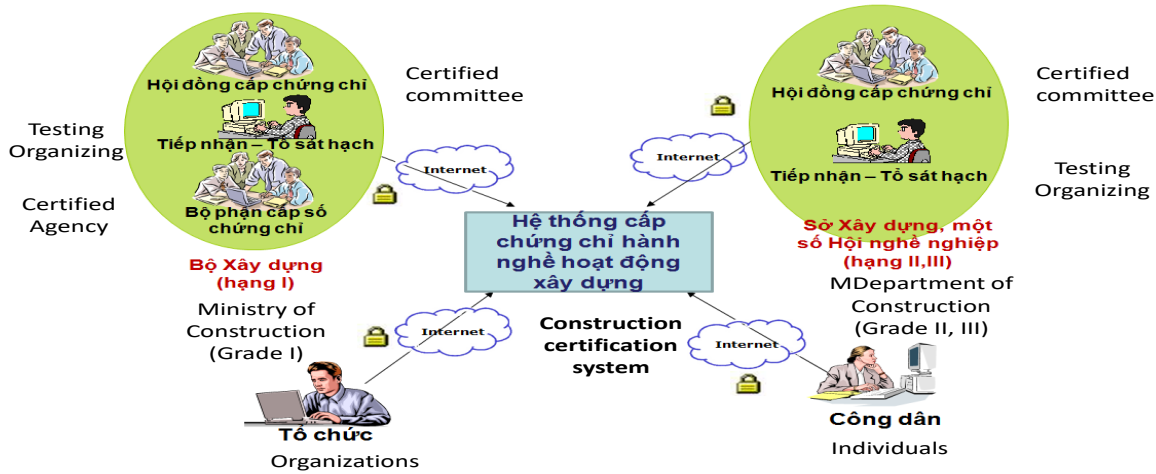
(1) Process of Acquiring Certificate of Construction Sector

Since the construction law shows that a document which certifies the construction capacity is required in working in the construction sector, the person who wants to work in the construction sector has to apply for a certificate. He/she can apply to renew the certification or apply for the new one if they do not have. Additionally, the construction law does neither clarify the name of organization which can issue the certificate nor the name of sub sector which the construction sector covers.

Procedures and ways to apply for professional certificates can be online or offline as following options.

Option 1: By post or visit the agency (at department of construction, Grade II, III). With the ministry of construction, the application can be submitted online.

Option 2: Online submission



- Necessary document for application
1. Application form for certification (according to the form in Decree No. 100/2018/ND-CP dated July 16, 2018;
 2. Notarized Professional diplomas and certificates;
 3. Notarized copies of decisions on assigning/assigned tasks of organization to individuals or written certification of investor's legal representative of typical jobs completed by the individual according to the declared content.

Source: Website of MOC

Figure 3.2 Certification System of Construction Sector

(2) Certification System of CNEE

Presently, certification system of CNEE is divided into 2 types;

- 1) Certificate in long term training course (training period of 3months) is issued by CUWC. Certificate/diploma issued by CUWC are valid through the country.
- 2) Certificate in short term training course by CNEE based on the Decision on establishment of CNEE which specifies that one of CNEE’s functions/duties is training activities. Criteria for issuing certification is to ensure quality requirement (attendance rate of minimum 80%, passed test).

Certificate issued by CNEE has been accepted by many agencies such as water supply and sewerage company, local authority, and valid in personnel evaluation following Vietnamese regulations with regard to training, labor safety and so on.

Annually, DOLISA (Department of Labor, Invalids and Social Affairs), DOC (Department of Construction), etc. conduct review and evaluation of companies under their authority, including personnel matter. As required, workers have to be trained by training organizations with legality.

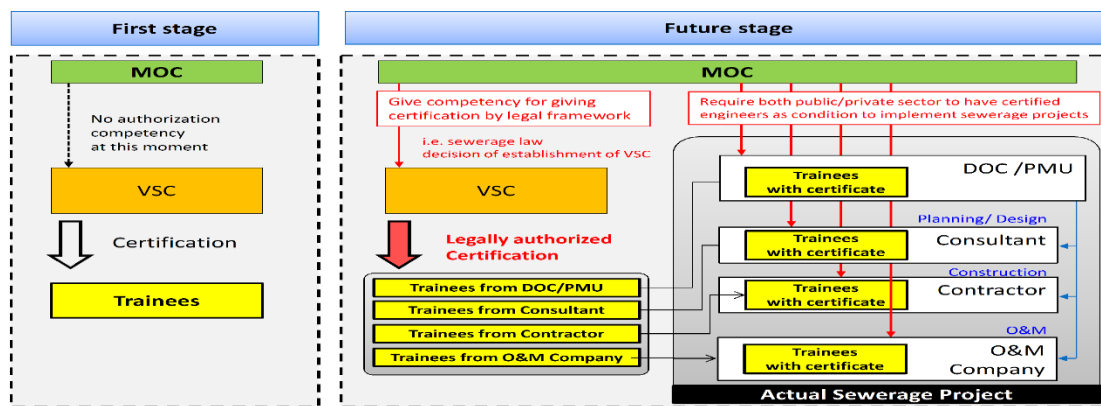
(3) Incentive for Applying This Training Course

At first, it is proposed to institutionalize this kind of qualification system for staffs engaging in sewerage and drainage projects for the following reasons.

- 1) For the local government: in order to enhance capacity of staffs and to give incentive to participate in this training course,
- 2) Private entity: not only to raise quality of service and enhance their capacity but also to secure financial sustainability of the training entity.

Additionally, in order to attract more trainees from private sector, first the possibility of training entity including CNEE/CUWC needs to be a Professional Social Organization with sufficient conditions for granting construction practice certificate of Class II and Class III under the Construction Law to individuals who completed this training courses in planning, designing and so on.

The above-described idea is summarized in Figure 3.3 although this idea needs to have more consideration to be realized.



Source: JICA Expert Team

Figure 3.3 Image of Qualification System

(4) Precondition of Approval as License

At present, every organization including CUWC issues the certificate for the trainee after completion of training course. However, this certificate only shows that the holder attended the training course and no more. In order to discriminate this training course conducted by CUWC from any other organization, the issue has to be approved as “license” in the relevant law such as “Sewerage Act”. It means that enactment of Sewerage Act is the precondition for introducing license system legally and officially.

However, the movement to promulgate the Sewerage Act has not been seen in MOC at the moment. In this sense, it is impossible to discriminate this training course from that in other organization till enactment of Sewerage Act which specify the condition of issuing license right now.

3.4 Conclusion of This Chapter

Based on the current conditions described in this chapter, the following items are clarified.

- 1) Necessity of human resource development for public officer is widely known and MOC has some subsidy system.
- 2) Existing Organizations including VWSA, AMC and CNEE/CUWC organize training courses for officials and engineers from JSC and private firms.
- 3) However, there is no specific training course and qualification system in sewerage sector prescribed by decree or law, which persons in charge of sewerage projects need to attend and acquire mandatorily.
- 4) Therefore, local governments, joint stock companies and private firms who work on sewerage projects will select the most attractive training courses.

4. Proposal on the Appropriate Structure for Training Activity of the Sewerage Sector in Vietnam

4.1 Comparison and Selection of the Appropriate Structure

JICA at first planned to establish “Vietnam Sewerage Center” under ATI/MOC and examine to be directly under MOC in the future, however, it became impossible due to the limitation of new organizations under Vietnam’s administration system in 2018. While CNEE/CUWC will take over the training course and implement these training program for the time being after termination of this project, it has to be considered which organization implements the training program effectively in the future.

Five (5) options with advantage and disadvantage of each organization and result of evaluation are proposed as shown in Table 4.1. The most appropriate training structure will be selected among 5 options or any other option in consideration of trend of development and circumstance surrounding the sewerage sector mainly from the institutional, financial point of view for future implementation organization.

As of this moment, JICA Expert Team evaluate the option-1 as the most realistic and possible to be implemented immediately, and JICA Expert Team also considers other options can be applied in the future.

Table 4.1 Option of the Most Appropriate Structure of Training

Organization in charge of training		Regulatory Organization	Advantage	Disadvantage	Evaluation
Position	Name/Description				
Existing organization	(1) Existing CNEE (Existing organization implements trainings.)	CUWC	<ul style="list-style-type: none"> The staff of CNEE can make maximal use of the experience and know-how derived from JICA's project. Training courses can be started immediately after JICA's project completes. 	<ul style="list-style-type: none"> Since this training course is very new and the publicity among local government is low, it might be difficult to recruit participants. 	1*
Establishment of new organization	(2) Sewerage Division of CNEE (CNEE is divided into the water division and the sewerage division. CUWC continues to manage both divisions.)		<ul style="list-style-type: none"> As same as above. This system can appeal outside that CUWC commits the sewerage sector besides water supply sector. 	<ul style="list-style-type: none"> As same as above. 	<ul style="list-style-type: none"> As same as above. CNEE has already implemented more than 10 sewerage training programs in combination with water supply project such as training program contracted with Noi Bai international airport company besides JICA project. Therefore, there is little necessity to divided into two organization. It requires a rearrangement of structure such as recruitment of new personnel, new room for new director, and so on.
	(3) New Training Center under ATI or MOC (New training center will be established, which will be financially independent from CUWC.)	ATI or MOC	<ul style="list-style-type: none"> ATI or MOC can utilize their power to support for collecting trainees. 	<ul style="list-style-type: none"> There is a risk of conflict with the government's policy to minimize administrative facilities, accordingly, it will take long time to establish the new organization. If the policy of MOC does not change, it is impossible to establish the new organization. 	3*
Incorporated with existing organization	(4) CIRD/Sewerage Division of CNEE (Two existing organizations will be incorporated.)	ATI	<ul style="list-style-type: none"> Since the regulatory organization of CIRD is ATI, the new organization does not have to increase administrative facilities. CIRD has a power to push each province/PMU to send the participants to the training course, although it is not the fundamental solution for securing the participants. Since the main function of CIRD is research and development of technical infrastructure, the function of both organizations are not duplicated. 	<ul style="list-style-type: none"> Since there is no discussion with this issue, it will take long time to adjust and incorporate existing two organizations. Since main function of CIRD is research and development and consultancy in the field of construction in general, the functions of both entities are different and the reason of incorporation is not clear. 	4*
	(5) VWSA/Sewerage Division of CNEE (Two existing organizations will be incorporated.)	Independent	<ul style="list-style-type: none"> VWSA has a lot of training experience in the sewerage sector, especially in O&M activities. Since the main subject of CNEE is planning and design field, the synergy effect is expected from planning to O&M stage, which means this new facility can implement the only one comprehensive training course in Vietnam. 	<ul style="list-style-type: none"> Since there is no discussion with this issue, it will take long time to adjust and incorporate existing two organizations. Most training programs of VWSA are under the projects financed by external donors such as GIZ. Therefore, if they withdraw, the trainings also stop or shrink working. Since VWSA is independent from MOC, it might be difficult for VWSA to incorporate with CNEE under MOC. 	4*

*1: Most realistic and possible to be implemented immediately, 2: Feasible after internal procedure of CUWC, 3: Difficult to apply soon, but expected to be achieved in the future, 4: Most difficult

Source: JICA Expert Team

4.2 Points to be Emphasized

Based on the training budget distributed by MOC, each local government dispatches their staff to the training course in the infrastructure sector including road, water supply, sewerage, solid waste, and so on, held by various organizations. For example, in the sewerage sector, plural training organizations as shown in Table 3.1 hold various kinds of training courses.

However, honestly speaking, it might be difficult for the local government to select CNEE/CUWC among various training course for the following reasons.

- 1) The number of local governments which will start sewerage project is still few, resulting in low incentive for dispatching their staff to the sewerage sector in comparison with another field sector.
- 2) Since CNEE is less-well known because it started the training course in 2017, while other organizations have long history and experience of implementing the training program.

Therefore, it is very important that the training course provided by CNEE/CUWC should be attractive and raises awareness among local government.

The points to be emphasized strongly are that only CNEE/CUWC can provide the training course specified in the planning and designing work of sewerage and drainage project in Vietnam. The other points to attract the relevant public and private entities are shown in Table 4.2.

CNEE has implemented a lot of water supply training programs at present as a result of steady effort for providing attractive curriculum, although little participants can be collected in the training program provided by CNEE in the initial stage. The same effort in the sewerage sector has to be conducted to compete with other organization.

Table 4.2 Points to be Emphasized for Public and Private Entities

No.	Point	Content
1	Training facilities	· CUWC has their own training facilities and it is possible to make the best use of these facilities.
2	Venue/Location	· CUWC can organize training courses in not only Hanoi but also in the local provinces as delivery courses.
3	Curriculum	· Subject specified in the sewerage sector in the planning and design stage · More practical one, case study based on actual example in Vietnam
4	Training method	· Participatory training including site visit, interactive discussion, exercise
5	Affordable tuition fee	· Tuition fee will be set in comparison with one in other organization, although it is difficult to be free because CUWC is a self-finance organization.
6	Appropriate training term	· Not too long, while sufficient term is required for attractive training course
7	Demonstration sewerage system in the premise of CUWC in the future	· The basic design of small-scale treatment facility along with sewer network of wastewater has been conducted in this project. · It will be a good educational material as demonstration facility for training participants to learn actual mechanism of sewage systems. · It will be recommended that CUWC will construct these facilities based

		on this basic design.
8	Utilization of alumni organization	<ul style="list-style-type: none"> · SNS network among the alumni will be set up in this project. · By using this system, the advantage of this training course along with good reputation will spread among the relevant organization/staff.

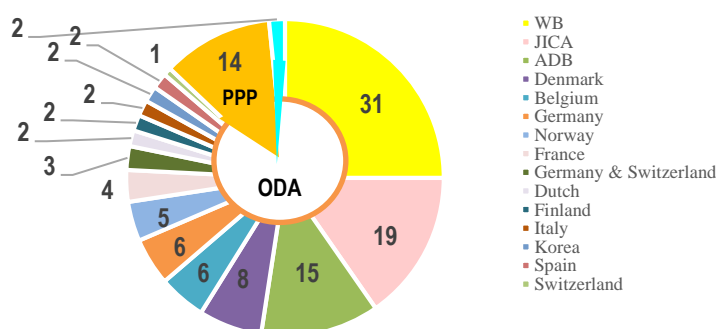
Source: JICA Expert Team

5. Proposal on the Tasks and Implementation Schedule of the Training Organization for Sewerage Sector

5.1 Required Tasks

(1) Review of the Current Situation of ODA Loan Project

Till now almost 90% of sewerage projects have been financed by ODA loan from various kinds of external donors. However, it would become difficult to construct the sewerage facilities under ODA scheme, from now on due to the following reasons.



Source: Sewerage Policy Advisor, JICA Expert in Ministry of Construction, Vietnam

Figure 5.1 Source of ODA Loan till Now

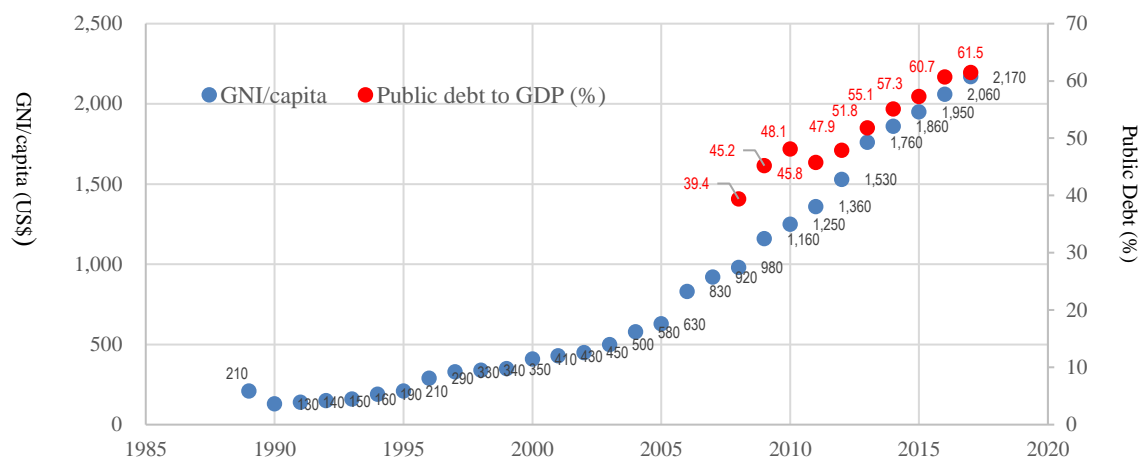
- 1) The ODA condition applied to Vietnam became strict because Vietnam became middle income country since 2016.
- 2) The government fund will remain limited in the coming time as it relies on loan (ODA or concessional loan), since the ratio of public debt to GDP will reach the upper threshold with 65%, which was set by National Assembly. The Vietnam's ratio of public debt to GDP in 2018 was 63.92% and the difference is only 1.08% of GDP. Even if the amount of public debt increases in proportion to GDP increase, it is not certain how much amount will be allocated in the sewerage sector.

World Bank is going to terminate Vietnam's ODA incentives in 2017, switching to preferential loans and then loans under market conditions. Following WB and ADB said that from the beginning of 2019, it would stop offering part of its preferential ODA package to Vietnam.

- 3) Government issued the decree No.15/2015/ND-CP dated February, 2015 on investment in the form of public private partnership in order to promote private sector's investment in infrastructure.

However, it is very difficult to attract the investor's interest in sewerage sector because the development in this field requires huge investment cost with slow payback rate, the investor will find it not attractive in term of investment return and profitability.

In addition, PPP is a new form of fund mobilization and guidance document is not available. These are the difficulties in cooperating and calling for investment in this sector.



Source: World Bank and Ministry of Planning and Investment of Vietnam

Figure 5.2 Trend of GNI/capita and Public Debt to GDP in Vietnam

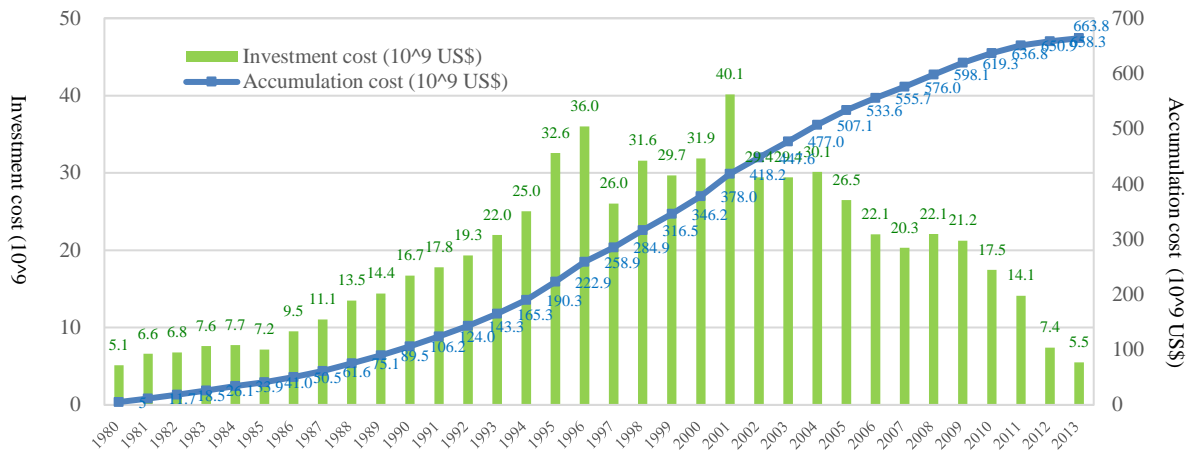
The sewerage system requires continuous huge investment cost for a long term, whether investment resource is ODA, government, or private entity in order to increase the sewerage service ratio. However, the sewerage project number might not increase as before in consideration of these circumstances around this sector.

Therefore, it is expected that the national government of Vietnam regards sewerage projects as more important and invests the sewerage sectors of local governments much more than before.

(2) Review of the Investment Cost of Sewerage Sector in Japan

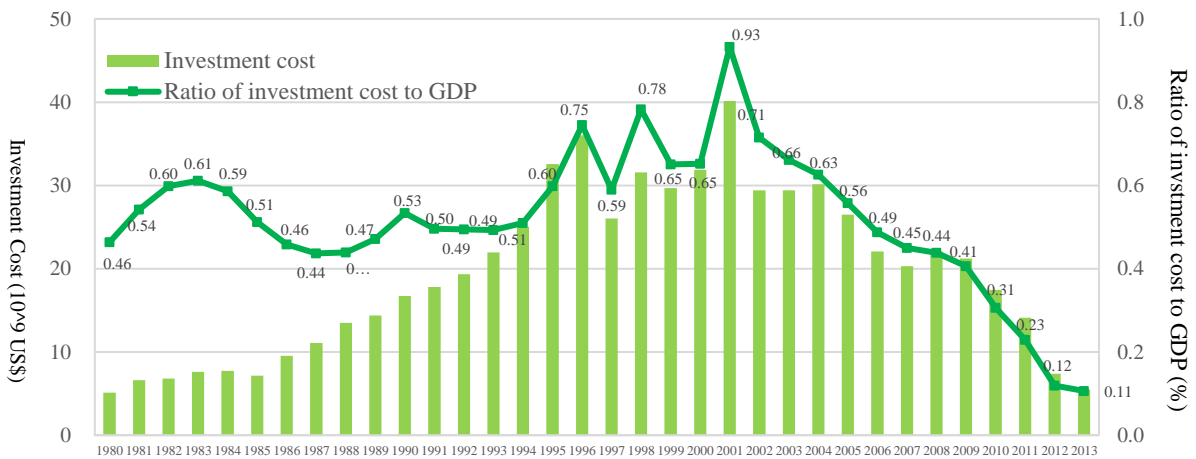
The trend of investment cost in sewerage sector in Japan is described in Figure 5.3 and Figure 5.4, the trend of sewerage service population in Japan is described in Figure 5.5, and the relation between investment cost and service population in Japan is shown in Figure 5.6.

The almost more than 0.5 -1.0% of GDP has been invested in the sewerage sector for almost 30 years. Since the population of Japan in 1970' was approximately 100 million which is almost same as that in Vietnam in 2025 as shown in Figure 5.7, the trend of investment cost in Japan will be useful in consideration of promoting the sewerage system in Vietnam, while price index in Japan is higher than that in Vietnam.



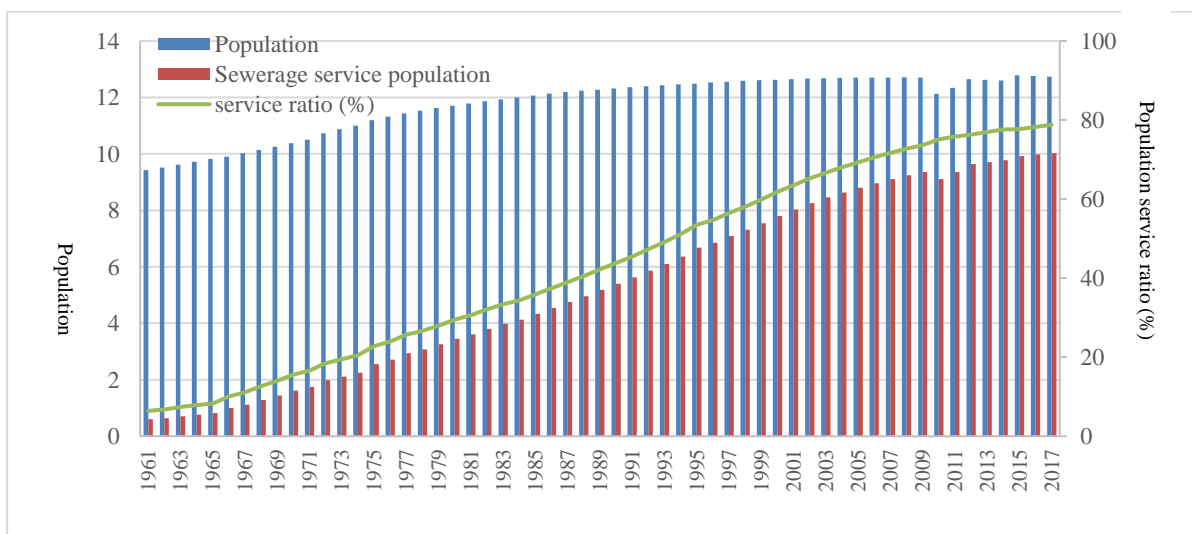
Source: Japan Sewage Works Association

Figure 5.3 Investment and Accumulation Cost in Sewerage Sector from 1980 to 2013 in Japan



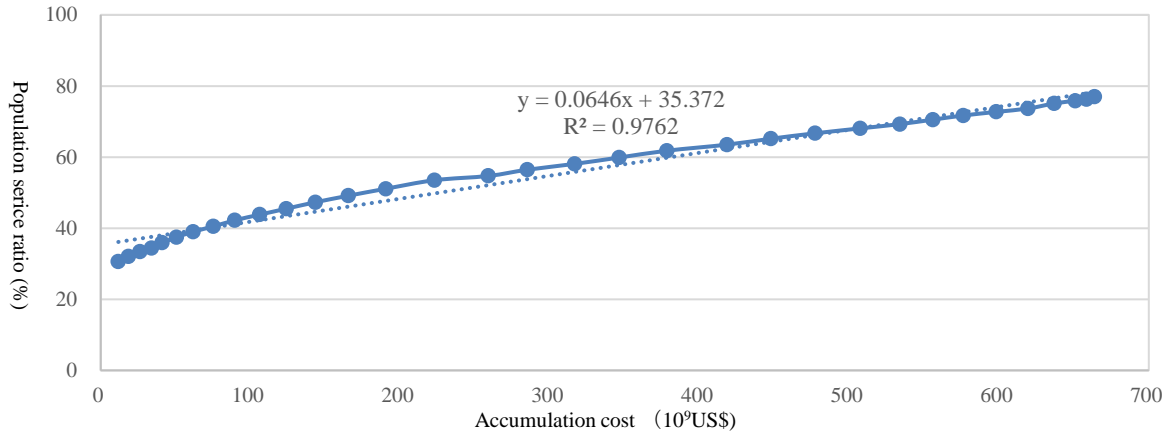
Source: Japan Sewage Works Association

Figure 5.4 Investment Cost and Ratio to GDP in Sewerage Sector from 1980 to 2013 in Japan



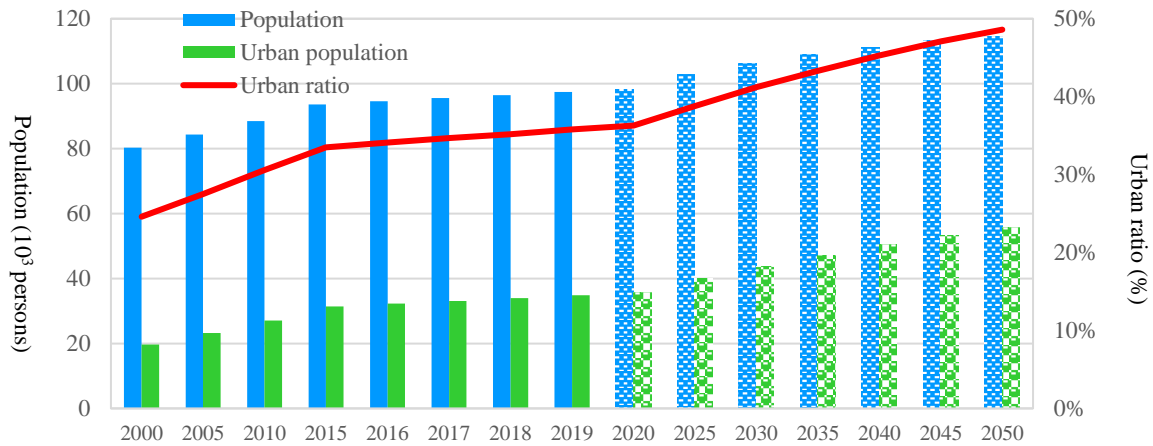
Source: Japan Sewage Works Association

Figure 5.5 Trend of Sewerage Service Population and Service Ratio in Japan



Source: JICA Expert Team

Figure 5.6 Relationship Between Accumulation Cost and Population Service Ratio in Japan



Source: World Population Prospects, UN

Figure 5.7 Projection of Population and Urban Ratio in Vietnam till 2050

(3) Proposed Major Target Subjects of the Training Course

The past trend of Japan shows that it takes 25 years to increase the service ratio of sewerage system from 10% to 50%, and it takes 50 years to increase the service ratio of sewerage system from 10% to 80%. Based on the review of the past trend of Japan and the current situation of Vietnam, the required major target subjects to be implemented in training courses are proposed as below.

Table 5.1 Proposed Major Target Subjects of the Training Course

Year	Necessary Role and Major Target Subjects
2020 – 2045	What is authentic sewerage system. How to plan and how to design the sewerage system.
2045 – 2070	Same as above, and how to execute the appropriate O&M of sewerage system.
2070 –	Same as above, and how to renew the facilities, how to extend the service life.

Source: JICA Expert Team

5.2 Implementation Schedule from 2020 to 2030

The implementation schedule of training activities from 2020 to 2030 is proposed below under the assumption that CNEE is the responsible agency till 2030.

5.2.1 Strategy of Clarifying the Responsible Entity in the Future

(1) Stage Wise Activity

The term till 2030 is divided into first stage and second stage as shown in Table 5.2.

Table 5.2 Schedule in Each Stage

Stage		Action	
		Content of training program	Organization structure
First Stage	2020-2022	Foundation	Study of role and activity of training organization
Second Stage	2022-2030	Modification in response of circumstances surrounding the sewerage sector	Discussion for items to be required in this training organization. Proposal and agreement of the most appropriate organization.

Source: JICA Expert Team

(2) Strategy of Each Stage

The activity of each stage will be implemented based on the following strategy.

1) First Stage

Almost 1.5 years have passed since the training in the planning course has started in October 2017 and that in the preliminary design course has started in March 2019. It means it is still a time of trial and error, and there is a lot work to be improved after reviewing its result as below.

- (a) There is a lot of works to improve the curriculum, training textbook in order to attract the participants more and more based on the real needs of participants. Therefore, CNEE has to focus on these improvement activities for a while.
- (b) CNEE has to decide whether the lecturer especially in the planning course is the staff of CUWC or outsourced from other entity, since only 10 % of lecturer of the planning course was the staff in CUWC. In the 5 times planning courses, total 49 persons worked as lecturers consisting of 2 persons from MOC (24.5%), 17persons from JICA Expert Team (34.7%), 4 persons from CUWC (8.2%), and 16 persons from private company (2.7%).
- (c) It is necessary to prepare the budget plan and clarify how much tuition fee is appropriate for participants and CNEE itself and the method of criteria for deciding tuition fee.
- (d) In the past training courses, various logistic works such as application procedure, preparation of training report based on the reply for the questionnaire from participants, and some miscellaneous works necessary for implementing training program were mainly conducted by JICA Expert Team. Therefore, it might take some time for CNEE to implement these training course properly, while CNEE has lot of experience in the water sector.

2) Second Stage

Along with the change of the development status of sewerage system in Vietnam, it is necessary to modify the training program. For example, while in the first stage, planning course is the very important issue, followed by design course, then O&M of sewerage facilities will be a very hot issue in case of increase of number of sewerage facilities which start operations.

In parallel with these actions, the most appropriate organizational structure in training entity will be considered. However, the fulfillment of training contents should be more prioritized than organizational structure. What to do at first is to make the foundation of necessary and very attractive training course for participant and acquire the good reputation.

5.2.2 Activity in Each Stage

(1) First Stage (2020-2022)

- 1) During this term, CNEE will continue to conduct the training course of planning and preliminary design, which has been described already in in the section 5.2.1 (2) 1) (a) – (d).
- 2) At the same time, CNEE/CUWC have a discussion with ATI/MOC for the future organization and required course. Based on this discussion, the concept of new organization structure will be clear.

(2) Second Stage (2022-2030)

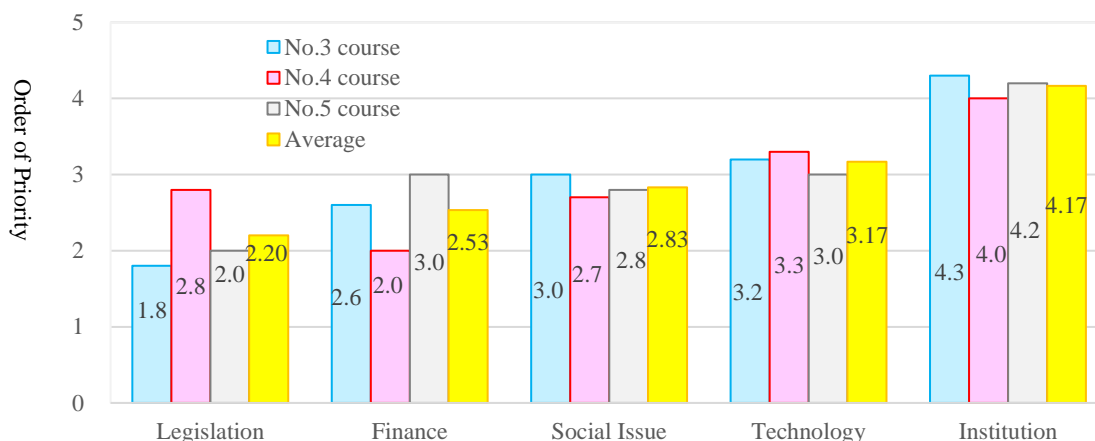
- 1) The absolute amount of official debt till the limit with 65% will become bigger in proportional of increase of GDP of Vietnam. Therefore, it is expected to increase the project number of sewerage sector. The main activity during this term focuses on the increase of participant, since participant number in the sewerage course increase, they will be key persons to promote the sewerage project. For this purpose, more attractive curriculum has to be provided to the participants.

With regard to the content of curriculum, the legislative, financial and financial issue will be added because the answer for questionnaire about a first priority for promoting the sewerage system in the past three planning courses was legislation, followed by finance, social issue, technology and institution as shown in Table 5.3 and Figure 5.8, respectively. Since this survey was started in third planning course, there are no data in first and second planning courses.

Table 5.3 Result of Questionnaire

Component	Content	No.3	No.4	No.5	Average
Legislation	Decree, circular, or ordinance, QCVN which clarify the obligation of each entity and regulation, etc.	1.8	2.8	2.0	2.2
Finance	Balance of income & expense, ratio of sewerage tariff to water one, low cost technology, allocation of sufficient budget to the sewerage work, etc.	2.6	2.0	3.0	2.5
Social issue	People's understanding of importance of sewerage system, willingness to paying sewerage tariff and promotion of house connection, etc.	3.0	2.7	2.8	2.8
Technology	Information and knowledge such as treatment process mechanism, new technologies in Japan, etc.	3.2	3.3	3.0	3.2
Institution	Concrete organization with sufficient staff number	4.3	4.0	4.2	4.2

Source: JICA Expert Team



Source: JICA Expert Team

Figure 5.8 Priority Order for Promoting Sewerage System in Vietnam

For example, the most critical issue in the sewerage sector in Vietnam is very low BOD due to little/no tertiary sewer, and house connection even if the tertiary sewer is installed. This should be enforced by resolution, decision, direction issued by local government. Public awareness/financial support is also a strong tool for house connection. In this sense, it is recommended that subject with regard to legislative, financial and social issue has to be included in the training course. In case of preparing the training materials, the commitment of advanced city such as Binh Duong province, Da Lat and Buon Ma Thuot is very preferable.

- 2) CUWC will continue to discuss the future organizational structure of training course with ATI/MOC and reach the conclusion of the appropriate organization in charge of training course, in parallel with modification of training content. Based on the conclusion from ATI/MOC, the necessary procedure will be conducted for realizing the conclusion among relevant organizations.
- 3) Furthermore, CUWC will develop a sewerage system in CUWC that consists of sewer lines, facilities of house connection and small-scale wastewater treatment plant, if CUWC has enough budget or additional grant aid. With use of this small-scale sewerage system in training courses as an experienced-based training facility, CUWC can promote greater understanding of trainees about the actual conditions, tasks and problems to be tackled of sewerage system.

5.3 Tentative Schedule

Tentative schedule for clarifying the organization in charge of training program is shown in Table 5.4.

Table 5.4 Tentative Schedule for Clarifying the Organization

Item	Major activity	First Stage (2020-2022)	Second Stage (2022-2030)
Curriculum	Some modification of existing curriculum	██████████	
	Addition of legislative, financial and social issues		██████████
Training material	Revision/modification of existing materials	██████████	
	Preparation of legislative, financial and social issues		██████████

	Development of small-scale sewerage system in CUWC		
Institutional issue	Personal and financial enforcement of CNEE		
	Brainstorming of future organization among relevant organization		
	Preparation of road map		
	Clarification of outline of function required in the training facilities		
	Concrete plan of training facilities		
	Confirmation of procedure for new training facilities		
	Action for advancing the procedure		
	Clarification of new organization		

Source: JICA Expert Team

6. Discussion of the Budget Plan

6.1 Current Condition of the Budget of CNEE

Since CNEE is a subordinate unit under authority of CUWC, CNEE does not have its own budget plan. And CUWC's budget is approved by MOC.

6.2 Training Result of CNEE in 2018

Basically, CNEE conducts the custom-made training course mainly in water supply sector. The training result in 2018 is shown in Table 6.1. The contract amount and expense in 2018 was 1,547,658,000 VND (ca. 70,350 US\$) and 1,498,098,200 VND (ca. 68,100 US\$), respectively and the final profit is 49,559,800 VND (2,250 US\$) as shown in yellow column.

Table 6.1 Training Result of CNEE in 2018

No.	Contract	Duration	Trainee Number	Price (10 ³ VND)			Note (4)=(3)/(1) (%)
				Contract (1)	Cost (2)	Profit (3)=(1)-(2)	
I	Training and retraining activities		725	1,547,658	916,926.5	630,731.5	
I.1	Center for water and environment training		535	1,329,658	760,950.5	568,707.5	
1	Fostering professional recording, operation and installation of pipelines	1-20/01	16	48,000	11,806	36,194	75.4
2	Cao Bang Water Company	8-12/1	2	4,000	-	4,000	100.0
3	Fostering professional recording and collection of water and pump operation	6-31/3	13	39,000	2,055	36,945	94.7
4	Fostering career in electricity	6-31/3	2	10,000		8,000	80.0
5	Nam Dinh Water Company	26-31/3	68	136,000		45,318	33.3
6	Quang Tri Water Company	31/3-1/4	66			33,517	49.7
7	Hanoi clean water company	18-22/6	35			55,620	49.7
8	Water quality management	4-13/6	2			6,800	68.0
9	Fostering pump operation	25/5-22/6	3			3,860	42.9
10	Fostering pump operation	11-30/6	7			21,000	100.0
11	Irrigation University	28/5-7/6	108			24,056	48.5
12	Consulting, coordinating to issue and participating in recruitment of Quang Tri clean water company	13-22/7	16	15,000	13,955	1,045	7.0
13	Khanh Hoa Water Supply and Sewerage Joint Stock Company	13-23/7	23	228,800	150,239	78,561	34.3
14	Cam Ranh Urban Joint Stock Company	13-22/7	6	42,000	0	42,000	100.0

No.	Contract	Duration	Trainee Number	Price (10 ³ VND)			Note (4)=(3)/(1) (%)
				Contract (1)	Cost (2)	Profit (3)=(1)-(2)	
15	Suoi Dau Water Supply and Sewerage Investment Joint Stock Company	12-19/9	1	10,000	0	10,000	100.0
16	Son La Water Supply Joint Stock Company	12-19/9	4	28,000	38,085	(10,085)	-36.0
17	Ha Tinh Water Supply Joint Stock Company	5-22/9	7	50,000	4,800	45,200	90.4
18	Pump Operation Certificate September 2018	15-24/11	11	30,000	6,091	23,909	79.7
19	DakLak Water Supply and Construction Investment Company Limited	15-24/11	18	144,000	111,973	32,027	22.2
20	Certificate of XL Operation Station (Daklak)	15-24/11	12	36,000	0	36,000	100.0
21	Noi Bai International Airport Company	27/11-5/12	10	64,790	43,550	21,240	32.8
22	Cao Bang Water Supply Joint Stock Company	28/11-2/12	11	22,000	6,613	1,587	69.9
23	Bac Giang Water Supply Joint Stock Company	17-21/12	25	37,500	34,528	2,972	7.9
24	Certificate of Pumping + Recording operation December 2018	03-21/12	8	24,000	0	24,000	100.0
25	Hanoi Water Supply Company Limited – Inspector	18-20/12	60	90,000	53,648	36,352	40.4
26	Certificate of inspection (grafting)	18-20/12	1	1,500		1,500	100.0
2017 transfer			0	0	66,710.5	(66,710.5)	
1	Khanh Hoa Company				26,907	(26,907)	2017 year
2	Hai Duong Water Company				19,650	(19,650)	2017 year
3	Bac Giang Water company				20,153.5	(20,153.5)	2017 year
I.2	Center of Central Vietnam		190	218,000	155,976	62,024	
1	Course Hà Tĩnh - Đắk Lắk	27/01/201	25	75,000	51,396	23,604	
2	Course Đắk Lắk	26/12/201	15	68,000	48,468	19,532	
3	Course Quảng Trị	28/12/201	150	75,000	56,112	18,888	
II	Center cost				581,171.7		
II.1	Center for water and environment training				581,171.7	(9,925.3)	
	Regular center cost, collaborator remuneration, equipment procurement				571,246		
II.2	Center for Central Vietnam				9,925.3	(9,925.3)	
General Summary				1,547,658	1,498,098.2	49,559.8	3.2
I. Training and retraining activities				1,547,658	916,926.5	630,731.5	40.8
1	Ha Noi water center				760,950.5	568,707.5	42.8
2	Central water center			218,000	155,976	62,024.0	28.5
II. Center cost					581,171.7	581,171.7	
1	Ha Noi water center				-571,246.4	-571,246.4	
2	Central water center				-9,925.3	-9,925.3	

Source: CNEE

6.3 Opinion of Collecting Tuition Fee

CNEE collects the tuition fee for all the training course described in Table 6.1 as a contracted cost. This value is calculated based on content of training program, including direct and indirect cost items, since CNEE is financially-independent in its activities. Other necessary cost such as remuneration of lecturer, supply, travel, etc., are also included in this amount. The training cost differs greatly depending on each course, and in some cases, CUWC may support a part of training course.

The tuition fee in the 5 times planning courses in this project were free for participants mainly in local government such as DOC, CPC, PPC etc., while CUWC borne the accommodation fee for participants and venue rental cost, and JICA borne the remaining cost consisting of printing and shipping of training materials, remuneration for engineers, certificate, stationary, farewell party, preparation of training course itself, and so on.

The director of CNEE explained about the tuition fee and budget plan as below.

- 1) There is a possibility of collecting tuition fee from them after CNEE will take over this training course.
- 2) If the main subject of training curriculum is useful for them, the local government will dispatch the staff to this training course by paying the training fee from the training cost distributed by MOC, and it will be decided by local government. This depends on the situation of each local government.
- 3) Each organization bears the accommodation cost depends on content of training course, venue/location, contracted party, and so on.
- 4) Financial independence is requested after 2020, since CNEE has no budget plan at this moment.

7. Conclusion and Recommendation

In order to realize sustainable development along with economic growth, development of sewerage and drainage infrastructure is indispensable. Vietnam has already committed to rapidly invest sewerage and drainage infrastructure to realize their target stated in Prime Minister's Decision No. 589. However, it is not easy to establish this target in consideration of current tight financial condition of Vietnam while huge cost has to be invested for a long time, as shown in the Japanese case.

ODA funds will be gradually reduced as Vietnam is no longer in the list of ODA recipients. Vietnam's public debt is at alarming level which pushes Ministry of Planning and Investment to give strict management over the use of ODA loans in infrastructure development. The project will be approved for implementation only if its necessity, urgency and big economic and environment benefits are proved. This means that the new number of sewage treatment plant might no more increase like before.

In order to win competition with other sectors, the clear effect for improving the water environment has to be shown. However, looking at the current situation of low BOD, it cannot be said that the sewerage system is effective due to no/little installation of tertiary sewer, because the combined system in Vietnam is in the transitional stage with no tertiary network. We have to avoid this situation any more in planning the sewerage system from now on. If the tertiary sewer will be included in the Project, the investment cost will increase. Therefore, it is necessary to devise measures to avoid a large increase in project costs. The engineer has to acquire the capability of making plan in consideration of financial, social point of view, besides technical one.

The purpose of training facility aims to provide the comprehensive knowledge to the local governments in charge of actual sewerage/drainage projects and private firms which provide the technical support to local government.

It is strongly recommended that CUWC will propose the road map for future organizational structure to ATI/MOC and reach the conclusion for appropriate training facility in order to accomplish this task comprehensively.

添付資料 E

家屋接続及び分流式下水道 整備状況実態調査レポート

**THE SOCIALIST REPUBLIC
OF VIETNAM
MINISTRY OF CONSTRUCTION**

**THE FACT-FINDING SURVEY ON
EXAMPLES OF BEST PRACTICES
OF HOUSE CONNECTION AND
TERTIARY PIPES**

REPORT

September, 2018

**JICA EXPERT TEAM FOR THE PROJECT FOR
ENHANCING MANAGEMENT CAPACITY OF
SEWAGE WORKS**

Exchange Rate

USD 1 = JPY 111.403000

USD 1 = VND 23,161

VND 1 = JPY 0.004810

(As of September, 2018)

THE FACT-FINDING SURVEY ON EXAMPLES OF BEST PRACTICES OF HOUSE CONNECTION AND TERTIARY PIPES

REPORT

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ABBREVIATION

ASBR	Advanced Sequencing Batch Reactor
BOD	Biochemical Oxygen Demand
BIWASE	Binh Duong Water-Environment Joint Stock Company
CAS	Conventional Activated Sludge Process
CPC	City People's Committee
DANIDA	Danish International Development Agency
JICA	Japan International Cooperation Agency
JSC	Joint Stock Company
KOBELCO	Kobe Steel, Ltd.
LAWACO	Lam Dong water supply and drainage company
MBBR	Moving Bed Bioreactor
O&M	Operation and Maintenance
PE pipe	Poly Ethylene pipe
SBR	Sequencing Batch Reactor
STP	Sewage Treatment Plant
VND	Vietnam Don

1. BACKGROUND OF THE PROJECT

The Government of Vietnam has considered the development of sewerage system as the urgent social issue, and has established the goal of development to achieve 50% of treatment of generated wastewater by 2025, and 100% of treatment of generated wastewater by 2050 in the five biggest cities and the central areas of cities controlled directly by provinces.

Based on the policy, new sewage treatment plants (hereinafter referred to "STPs") have been developed in Vietnam, however appropriate sewage collection system is not accompanied with new STPs development. For example, tertiary pipes for taking in wastewater generated in each household is not connected with the main pipelines which flow into the STP. This means that only a small amount of sewage flows into the new STP. Also, wastewater is diluted with gray water due to the undeveloped of house connections and tertiary pipes, which makes the wastewater quality to STP differ from the design condition of STP.

After all, STPs would be excessive design, and unfortunately the developing of them will not contribute to improvement of water pollution problem in Vietnam.

For these reasons above, it is shown that carrying out house connection and tertiary pipe installation is the key point of developing the appropriate sewage system.

2. OBJECTIVE OF THE PROJECT

According to our documentary searching, it was revealed that three cities, Buon Me Thuot City, Da Lat City and Binh Duong Province, have developed separate sewage collection system with house-connection and tertiary pipes, which are considered as authentic sewerage systems and being similar with ones in developed countries.

Thus, JICA expert team decided to survey these cities to get their experiences and knowledge, which will surely contribute to brushing up the VSC training course.

3. METHODOLOGY OF SURVEY

The survey is composed of interview and site visit. The questionnaire was prepared and sent to the target cities and organizations in advance. Questions are stated in the following pages. Also, related documents were collected.

**QUESTIONNAIRE ABOUT YOUR SUCCESSFUL EXAMPLE OF HOUSE CONNECTION
TO SEWERAGE SYSTEM**

1. Respondent

- (1) Name:
- (2) Organization and position
- (3) Telephone number:
- (4) E-mail address:

2. Basic information of sewerage system

Please fill in blank in the Table 1.

Table 1 Basic information of sewerage system

Item	Unit	Quantity/Result
Service area	Ha	
Service population	Person	
Length of Sewer	M	Φ Φ Φ Φ
Pumping station	Number	
Sewage Treatment Plant	Treatment Process	
	Capacity	m ³ /day
	Influent BOD	mg/l
	Effluent BOD	mg/l
	Influent SS	mg/l
Investment cost	Effluent SS	mg/l
	Sewer	US\$
	Pumping station	US\$
	Sewage treatment plant	US\$
Financial resources	Total	US\$
	Vietnam	US\$
Year	DANIDA	US\$
	Start of construction	
Current condition	Start of operation	
	Inflow quantity	m ³ /day
	Inflow BOD	
	Effluent BOD	

3. Confirmation of the Definition of House Connection

Our understanding of house connection method is shown in the following figures. Is this correct?

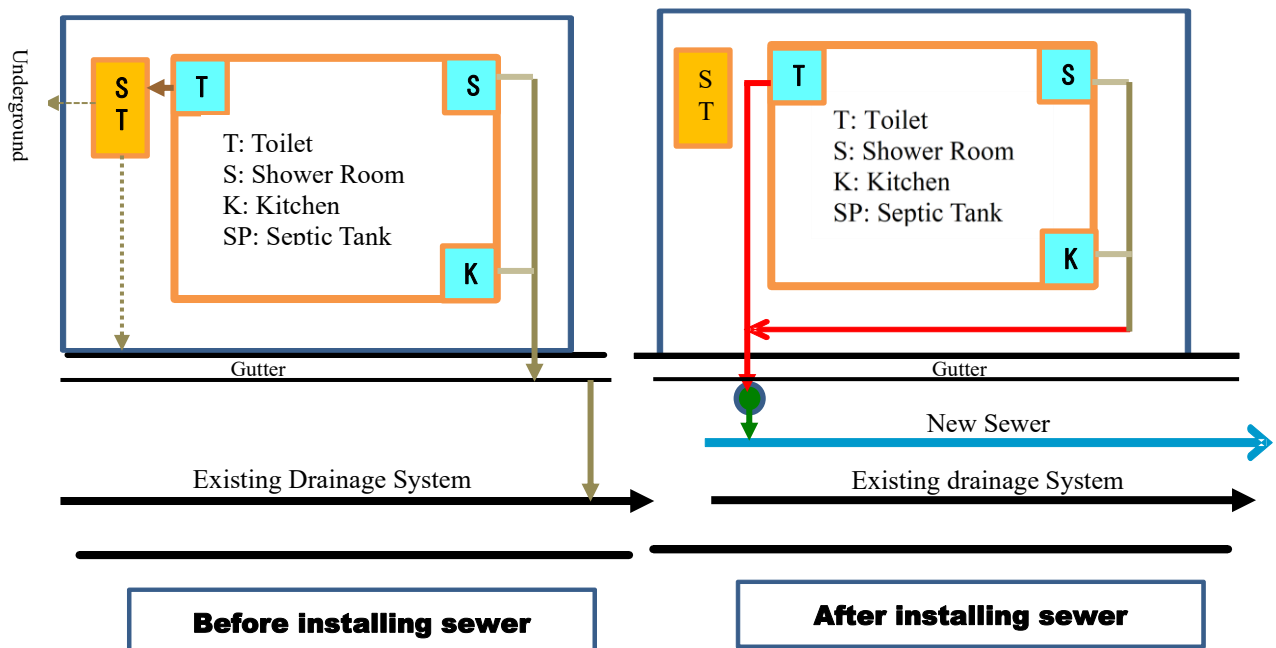


Figure 1 Scheme of house connection

Responsible entity for installing the following item

- 1) Connection box (green circle): public entity
- 2) Installation of connection pipe (green line): public entity
- 3) House connection (red line): Resident
4. Sewerage Sector Master Plan

(1) Do you have a sewerage sector master plan?

(2) If you have, please provide us with the Master plan.

(3) Please clarify whether the following items are included in this this Master Plan.

(a) Service area

(b) Service population

(c) Collection system (separate, combined and interceptor system)

(d) Quantity of inflow consisting of domestic, commercial, industrial wastewater, and underground,

(e) Ratio of daily maximum and hourly maximum inflow to daily average inflow

(f) BOD and SS load of inflow

(g) Usage/Disposal of generated sludge after treatment

5. Legal System

(1) Do you have a legal system which clarifies the following items?

(a) Preferable collection system among separate, combined and interceptor one?

(b) The resident in the service area with separate collection system has an obligation of house connection by their own expense and penalty is imposed if the resident does not conduct the house connection

(2) If you have, please inform us of the name of legal system.

6. Your Choice of Separate System

(1) Please inform us of the reason why you chose the separate system while major sewage collection system in Vietnam is interceptor one.

(2) What was the solution in adopting the separate system in design, implementation and O&M stage? Please fill in blank of Table 2.

Table 2 Solution of issues in the separate system

Stage	Issue	Solution
Design	Increase of cost	
	Long construction period	
	Any other	
Implementation	Residential understanding and cooperation	
	Any other	
O&M	Increase of inflow due to misconnection of rain water into the sewer.	
	Any other	

7. Design criteria (Refer to Figure 1)

7.1 Connection Box

(1) Do you have design criteria (material, size, depth, invert slope, etc.)?

(2) If you have, please provide us with this design criteria.

7.2 House connection

(1) Do you have any design criteria/guideline (pipe diameter, materials, slope, condition of installing handhole, earth cover or depth of pipe, and so on)?

(2) If you have, please provide us with this design criteria.

8. Responsible Organization engaged in promoting house connection

8.1. Promotion of house connection by PMU

(1) Please provide us with the outline, structure, role/staff number of each division of PMU.

(2) Please inform us of the name of division and staff number engaged in promoting house connection work in PMU.

(3) Please inform us of the main survey/activity and problem in this division.

Please fill in blank of Table 3.

Table 3 Main survey/activity

Stage	Main survey/activity	Problem
Detailed design		
Implementation		

8.2. Promotion of house connection by the entity except PMU

- (1) Please inform us of the reason why specified entity was established except PMU.
- (2) Please provide us with the name, outline, structure, role/staff number of this entity.

8.3. Public awareness

- (1) Name of responsible entity and staff number engaged in this work

Please fill in blank of Table 4.

Table 4 Performance of public awareness

Stage	Name of responsible entity	Staff number	Main activity		
			Activity	Frequency	Effect
Design					
Implementation					
O&M					

- (2) When did you start these activities?
- (3) How about the response or complain from resident?
- (4) What do you think the key/critical point of success?
- (5) How about the commitment of community or NGO?
- (6) How about the reaction, role, concern and other issue of CPC or PPC?

9. Point to be considered in implementing House connection

- (1) Which entity decided the location/depth of connection box?
- (2) Please show us the procedure for house connection. (For example, 1) at first, the resident submits the design of house connection 2) Acquisition of approval from the responsible division, 3) Actual house connection work by private company, 4) Report of completion of house connection work and so on)
- (3) Guidance to the private company
 - (a) Did you issue the license/certificate to the private company which conducted the house connection work? If so, what was the requirement for the private company to acquire qualification?
 - (b) Did you provide the private company with the information/design criteria/guideline of house connection, if you have these items?
 - (c) Did you organize a periodical workshop for them to understand the importance of house connection work and to conduct this work correctly? If so, how frequency you hold this workshop?

(4) Check list of house connection work

- (a) Do you have a check list whether the house connection work conducted by the private company was correct or not? If you have a check list, please provide us with it.
- (b) Did you include the following check point?
 - 1) Compliance with the design criteria/guideline if you have
 - 2) Separation of rain water and domestic wastewater
 - 3) Leaving or demolishing septic tank
 - 4) Any other if you have
- (c) In case of wrong work, did you order the private company for repairing the work?

(5) Expense of house connection

- (a) How much was the average expense of house connection work?
- (b) How much was the ratio of the expense of house connection to their total household income? Was it too high for them to bear this expense or not so?
- (c) Did you have any financial supporting system as shown below?
 - 1) Subsidy from any entity including you, if so, how much did you subsidy for each household?
 - 2) Interest supplementary when the resident borrows the money from the bank
 - 3) The revolving system is common in Vietnam. Did resident use the revolving fund?
 - 4) Any other if you have

10. Grasp of connection rate

- (1) How do you calculate the connection ratio?
- (2) How did you grasp the connection ratio?
- (3) What kind of action did you take for resident with no connection?

11. Relation between connection ratio and inflow to Sewage Treatment Plant (STP)

- (1) Have you acquired the data of quantity and quality of sewage inflowing to STP?
- (2) Did you think that there was a good correlation between the connection ratio and the sewage quantity/quality inflow to STP?

12. Sewerage Tariff System

- (1) Please inform us of the sewerage tariff system and collection ratio of sewerage tariff.
- (2) How frequency you revise the sewerage tariff system, for example every 3 years and so on?
- (3) Which organization approve the revision of sewerage tariff system?

- (4) Does the income from sewerage tariff cover the O&M cost of sewerage system?
- (5) If no, what kind of action do you take? Please fill in blank of Table 5.

Table 5 Action for improving balance of sewerage tariff

Purpose	Action	Effect of the action
Increase of income		
Decrease of expense		

- (6) What kind of action for compensating the deficit do you take?
- (7) What is the legal basis of sewerage tariff, such as decision?

13. Positive Effect of the Separate System

- (1) Was there any response from resident? Do you think that they were satisfied with the separate system or not so interested in the sewerage system?
- (2) Do you think that the quality of public water body has been improved? If so, Please show us the place where water body has been improved.

14. Your Advices

The number of municipalities which adopted the separate system in Vietnam is only three at present.

- (1) What do you think the most critical issue for promoting the separate system while the major is still interceptor like combined one?
- (2) Please clarify the role and legal system of central / local government for proceeding separate system.
- (3) Please give advice to the local government which wishes to adopt the separate system.

End of questionnaire

Thank you very much for cooperation.

4. SCHEDULE OF SURVEY

The interview and site visit were conducted as following schedule.

Table 1 Schedule of survey

Date	Activity
10-Sept.	Meeting with Dak Lak Urban & Environment JSC
	Site visit in Buon Me Thuot City
	- Household connection
	- Tertiary sewer and Pumping station
11-Sept.	- Sewage treatment plant
	Site visit wastewater treatment plant, sludge reuse system in Da Lat City
12-Sept.	Meeting with LAWACO
	Site visit for tertiary sewer and pumping station in Da Lat City.
13-Sept.	Meeting with BIWASE
	Site visit in Binh Duong Province
	- Tertiary sewer and Pumping station
	- Sewage treatment plant

5. SURVEY MEMBER

Survey team member is shown in Table 2.

Table 2 Survey member list

No.	Name	Organization/Position
1	Tamaki MORI	JICA long-term expert
2	Do Thi Nga	National project coordinator of JICA expert team
3	Takeki KAJIURA	Nippon Koei (JICA Consultant)
4	Hiroko KAMATA	Nippon Koei (JICA Consultant)
5	Satomi TABATA	Nippon Koei (JICA Consultant)
6	Do Thanh Van	Secretary of Nippon Koei
7	Do Thuan An	Vietnam Water, Sanitation and Environment JSC.
8	Makoto IBARAKI	Sewerage Policy Advisor, JICA Expert in Ministry of Construction
9	Yuko KANTO	Project Formulation Advisor in JICA Vietnam office
10	Nguyen Vu Tiep	Program Officer in JICA Vietnam office

6. TARGET CITY AND ORGANIZATION

Target cities are located as shown in Figure 1. Management organizations for each city are shown in Table 3.

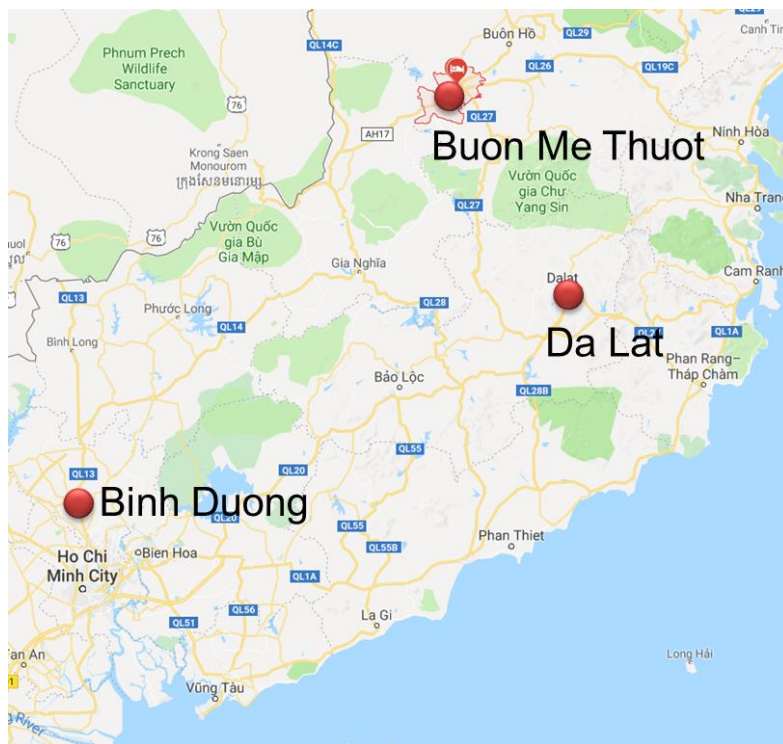


Figure 1 Location of target cities/province

Table 3 Management organizations in the target cities/province

Cities/Province	Organization
Buon Me Thuot City	Dak Lak Urban & Environment Joint Stock Company
Da Lat City	Lam Dong water supply and drainage company (LAWACO)
Binh Duong Province	Binh Duong Water-Environment Joint Stock Company (BIWASE)

7. SURVEY RESULT

7.1 Buon Me Thuot City / Dak Lak Urban & Environment JSC

7.1.1 Result of Interview

The interview with Dak Lak Urban & Environment JSC was held on 10th September, 2018 at their office. The interviewee list is shown in Table 4.

Table 4 Interviewee list of Dak Lak Urban & Environment JSC

No.	Name	Organization/Position
1	Ms. Suong	Vice Director of Dak Lak Urban and Environment JSC cum Director of PMU
2	Mr. Dung	Head of Planning Division
3	Mr. Huy	Vice Manager of Sewerage Enterprise



Outlook of their office



Interview

Figure 2 Interview with Dak Lak Urban & Environment JSC

The basic information of sewerage system in Buon Me Thuot City was acquired through the interview as shown in Table 5. The answer of questionnaire is attached in the appendix.

The project had been divided into two phases and implemented with Danish financial support.

Table 5 Basic information of the project in Buon Me Thuot City

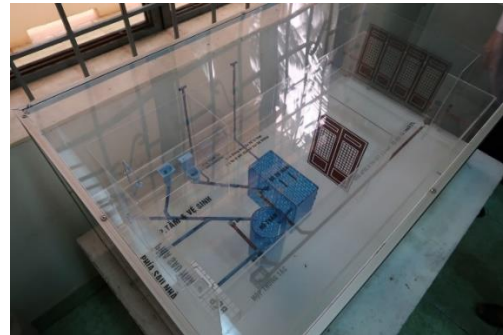
Item	Unit	Quantity/Result	
Service area	ha	438.6ha (Phase 1:131.9ha, Phase 2: 308.2ha)	
Service population	Person	106,897 persons (Phase1:41,555, Phase2: 65,342)	
Length of Sewer	m	149,842m (Phase1:52,662m, Phase2 : 97,180m)	
Financial resource phase 1	Vietnam	VND	73,847,000,000 (3,188,461USD)
	DANIDA	VND	276,815,000,000 (11,951,924USD)
Financial resource phase 2	Vietnam	VND	204,813,000,000 (8,843,124USD)
	DANIDA	VND	299,339,000,000 (12,924,433USD)

The provided information related to the implementation of house connection and development of tertiary pipe are summarized below.

- 1) Separated system had been studied and selected at the beginning of First Stage Project in 1999.
- 2) The province issued the specific regulation on drainage and sewerage management works following Decree No. 80/2014/ND-CP dated 6th August 2014) and DANIDA (Danish International Development Agency) also issued the project's regulation on this works. Decree No. 80 is stated in the summary and attached in appendix.
- 3) The target number of house connection for phase 1 and 2 are 5,500 and 9,000 respectively, and 90% of target number in phase 1 has been accomplished.
- 4) Domestic sewage can be discharged to sewer pipes directly. Also, septic tanks were demolished or backfilled after the tertiary sewer and connection box had been installed.
- 5) Project management unit (hereinafter referred to "PMU") had implemented the Public Relation (hereinafter referred to "PR") activity for each district with cooperation with city people's committee (hereinafter referred to "CPC"). PMU officers (3 members) had worked on the PR activity with the use of model of house connection and explanator board as shown in Figure 3. According to the interview it was difficult to promote house connection works to the owners of old houses because they hesitate to break their floors.
- 6) In order to facilitate house connection works, local authorities and related agencies had helped PR activities. The number of members in wards are totally 51 persons.
- 7) Residents choose their contractors from the contractors list which Project Management Board prepared by themselves. License or certification was not issued for the contractors, but they were trained for the house connection works.
- 8) As financial support system, 1,200,000VND is provided to each household if residential people implement house connection work within two years after sewer pipe installation.
- 9) There is no penalty even if residents do not conduct their house connection work.
- 10) The sewerage tariff is not collected, however 10% of water supply fee is collected as environmental protection fee. Buon Me Thuot city is now preparing the road map to formulate the sewerage tariff.



Explanatory board



Model of house connection

Figure 3 Display for PR activity

Also, related documents shown below are provided by Dak Lak Urban & Environment JSC in this survey.

- List of quantity for the second phase project (shown in Table 6)
- Drawings of connection box (see the appendix)
- Project report: Danish Mixed Credit Scheme Project on extension of drainage & sewerage system and house connections in Buon Me Thuot city, Daklak province, Vietnam

Table 6 List of pipes installed in phase 2

No.	Work items	Unit	Quantity		Total	
			Designed quantity	Actual construction quantity	Following design	Following actual work
A	Drainage system					
1	Reinforced concrete pipe D300	m	4,832	2,887	14,958	12,903
2	Reinforced concrete pipe D400	m	3,621	3,330		
3	Reinforced concrete pipe D600	m	3,515	3,728		
4	Reinforced concrete pipe D800	m	1,729	1,813		
5	Reinforced concrete pipe D1000	m	1,261	1,145		
6	manhole	number	358	352	358	352
7	catch pit for new constructed road surface water	number	540	506	540	506
8	Road surface water catch pit + New construction + renovation	number	515	395	515	395
B	Sewerage system					
I	Package EPC					
1	uPVC pipe D200	m	30,335	28,414	37,515	35,392
2	uPVC pipe D250	m	2,675	2,527		
3	uPVC pipe D300	m	1,736	1,736		
4	uPVC pipe D400	m	2,518	2,470		
5	uPVC pipe D500	m	251	245		
6	manhole	number	890	918	890	918
7	manhole for inspection	number	696	627	696	627
II	EC package					
1	CP 01					
1.1	uPVC pipe D150	m	18,432.08	8581.702	20,426	9,522
1.2	uPVC pipe D200	m	1,994.09	940.50		
1.3	connection box	number	2,840	1,408		
1.4	wash box	number	324	171		
1.5	diversion chamber	number	125	63		
1.6	manhole	number	7	0		
2	CP 02					
2.1	uPVC pipe D150	m	16,972	16,439	17,198	16,600
2.2	uPVC pipe D200	m	226	161		
2.3	connection box	number	2,705	2,616		
2.4	wash box	number	317	302		
2.5	diversion chamber	number	244	241		
2.6	manhole	number	2	2		
3	CP 03					
3.1	uPVC Pipe D150	m	20,461	20,639	21,938	22,099
3.2	uPVC pipe D200	m	1,477	1,459		
3.3	Connection box	number	3,426	3,344		
3.4	wash box	number	365	348		
3.5	diversion chamber	number	202	171		
3.6	manhole	number	21	41		

7.1.2 Site visit

(1) House connection and tertiary pipe

Poly Ethylene type connection box that our training recommends has already been introduced as shown in Figure 4. Drawing of connection box and house connection are attached in the appendix. The material of connection box and its cover are concrete, and house connection pipe are PVC.



Pipe installation



Connection box receiving sewage from the store



Inside of connection box



Checking of inside of connection box

Figure 4 House connection in Buon Me Thuot city

(2) Sewage treatment plant

There are two STPs in the same site. The basic information of each plant is shown in Table 7. The one which is constructed in the first phase is under operation, and the other one is under the trial running.

Table 7 Basic information of sewage treatment plant in Buon Me Thout City

Item	Phase 1	Phase 2
Capacity	8,125 m ³ /day	6,075 m ³ /day
Treatment method	Aeration pond	Moving bed bio reactor (MBBR)
Start of construction	2003	2016
Start of operation	2006	2019
Inflow volume	4,5000 m ³ /day	—
Influent BOD	913 mg/L	—

**THE PROJECT FOR ENHANCING
MANAGEMENT CAPACITY OF SEWERAGE WORKS**

Item	Phase 1	Phase 2
Effluent BOD	39.5 mg/L	30 mg/L
Influent SS	1,216 mg/L	—
Effluent SS	47.2 mg/L	50 mg/L

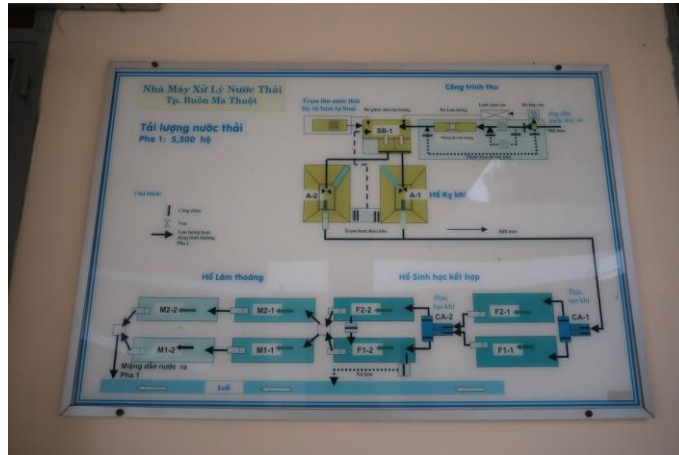


Figure 5 Water flow



Administration building



Screen



Screen



Screen



Diversion tank (SB-1)



Outlet of diversion tank (SB-1)



Anaerobic pond (A1, A2)



Garbage in anaerobic pond



Cascade aeration (CA1)



Facultative pond (F2-1, F1-1)



Operation regulation of cascade aeration (CA2)



Cascade aeration (CA2)



Operation regulation of Facultative pond (F2-2)



Facultative pond



Maturation pond (M1-1)



Outlet

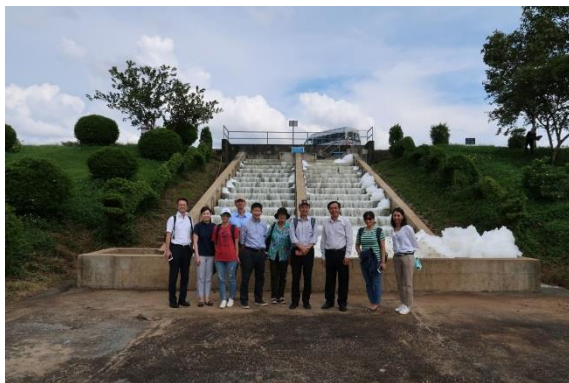


Figure 6 STP constructed in phase 1



Outer side of treatment tank



MBBR tank and sedimentation tank



MBBR tank



Floating media

Figure 7 STP under construction in phase 2

7.2 Da Lat City / LAWACO

7.2.1 Result of Interview

The interview with LAWACO was held on the 11th of September 2018 at the STP and 12th of September, 2018 at their office. The interviewee list is shown in Table 8.

Table 8 Interviewee list of LAWACO

Date	No.	Name	Organization/Position
Sept. 11st	1	Mr. Khanh	Director of STP
	2	Ms. Van	Vice Director of STP
	3	Mr. The	Workshops Manager
Sept. 12nd	1	Mr. Cuong	Vice General Director
	2	Mr. Chat	Head of Technical Division
	3	Mr. Khanh	Director of STP



Interview at the STP



Interview at their office

Figure 8 Interview with LAWACO

The basic information of sewerage system in Da Lat City was acquired through the interview as shown in Table 9. The answer of questionnaire is attached in the appendix.

Table 9 Basic information of the project in Da Lat city

Item		Unit	Quantity/Result
Service area (No information about area)		—	2 central wards (all area is covered)
			A part of wards 5,6,8,10;
			Wards 3, 4, 7, 9, 10 (expanded area)
Service population		Person	90,000
Length of Sewer		m	193,000 (Φ100 -600mm)
Pumping station		Number	8 stations (phase 1)
			6 stations (phase 2)
Investment cost	Sewer	US\$	8,274,000
	Pumping station	US\$	1,162,800
	Sewage treatment plant	US\$	11,755,200
	Total	US\$	21,642,000

The provided information related to the implementation of house connection and development of tertiary pipe are summarized below.

- 1) The legal system is Decision No. 26/2016/QĐ-UBND dated April 6th 2016 by Chairman of Lam Dong PPC on stipulation of sewerage management in Lam Dong area.
- 2) There is not regulation on sewer pipe design, thus LAWACO referred to the cases in many provinces and obtained experience in phase 1. It took so much time and cost a lot because topographic condition is complicated.
- 3) There is not private company which carries out house connection work. All the installation work was implemented by LAWACO.
- 4) Basically, domestic sewage can be discharged to sewer pipes directly and septic tank can be demolished or backfilled after the tertiary sewer and connection box are installed. Also, it is not necessary to install septic tank for new household or they can install temporary infiltration hole during waiting for construction of connection box under the Project.
- 5) LAWACO implemented the PRs activities in the evening or night once or twice for each district with use of the descriptive model and panel exhibited in the STP. Also, PR activities were implemented through local TV and radio programs.
- 6) If residential people implement house connection during the project period, they can receive the subsidy covering 100% of necessary cost. Otherwise, they have to bear all cost.
- 7) Sewerage unit price in the project covered area is 6,261 VND/m³, of which, residents have to pay 3,198 VND/m³, and 3,063 VND/m³ will be subsidized by state budget. For the un-connected households, 500 VND/m³ of water supply tariff is collected as environmental protection cost. Tariff is revised every 5 years.

Also, related documents shown below are obtained in this survey.

- Regulation on sewerage & drainage management in Lam Dong province (see the appendix)
- Water flow of sewage treatment plant (see the appendix)
- Answer for your concerns (see the appendix)
- Operational improvement plan of Lam Dong water supply and drainage one member limited company
- International bank for reconstruction and development and international development association project paper on a proposed additional loan in the amount of US\$69 million and a proposed additional credit in the amount of SDR 35.5 million to the socialist republic of Vietnam for the Vietnam urban water supply and wastewater project. 2016

7.2.2 Site visit

(1) House connection and tertiary pipe

It was confirmed that Poly Ethylene type connection box which our training recommends has been introduced. The material of connection boxes and tertiary pipes are PVC. The cover of the connection box was made from concrete.



Manhole



Inside of a manhole



Pipe is installed along the river



Inside of a manhole



Inside of a manhole

Figure 9 Pipelines and manholes

(2) Pumping station

Da La city is mountainous and has many uphill and downhill, therefore many pumping stations are installed. Tram Bom Nuoc Thai wastewater pumping station we visited on the survey was well maintained. According to the interview with the staff in the pumping station, generator has regularly run once in a month.



Gate of pumping station



Screen



Pumps



Inside of pump pit



Checking of inside of pump pit



Pump



Generator



Interview at pumping station

Figure 10 Pumping station

(3) Sewage treatment plant

This sewage treatment plant has 12,400 m³/day of capacity in total. Sludge is dried by drying bed, and all the dried sludge is used for fertilizer.

In the interview, they asked us some questions about removal of ammonia/coliform and utilization of sludge in Japan. Questions and answers are summarized in appendix.

Table 10 Basic information of sewage treatment plant in Da Lat City

Item	Phase 1	Phase 2
Capacity	5,000 m ³ /day	7,400 m ³ /day
Treatment method	Imhoff Tank + Trickling filter	Trickling filter
Start of construction	2002	2014
Start of operation	2005	2018
Inflow volume	8,000 m ³ /day	
Influent BOD	Design 273 mg/L, Actual 331 mg/L	
Effluent BOD	40.5 mg/L	
Influent SS	400 mg/L	
Effluent SS	Design 81 mg/L, Actual 11.8 mg/L	



Screen



Grit chamber



Imhoff tank



Aerated Lagoon (not used at present)



Trickling filter tank



Stabilization pond



Disinfection tank



Outlet



Outlet



Outlet



Drying bed



Drying bed



Dried sludge packed in a bag

Figure 11 Sewage treatment plant in Da Lat city

7.3 Binh Duong Province / Binh Duong Water-Environment JSC (BIWASE)

7.3.1 Result of Interview

The interview with BIWASE was held in 13th September, 2018 at their office. The interviewee list is shown in Table 11.

Table 11 Interviewee list of BIWASE

No.	Name	Organization/Position
1	Mr. Thien	President of BIWASE
2	Ms. Van	Vice Director of PMU
3	Mr. Vinh	Director of STP
4	Mr. Ky	Officer of PMU
5	Mr. Khanh	PR Team
6	Mr. Huong	PR Team



Interview with BIWASE



Interview with BIWASE



Sharing the understanding of separate sewage system



BIWASE water

Figure 12 Interview with BIWASE

The basic information of sewerage system in Binh Duong Province was acquired through the interview as shown in Table 12. The answer of questionnaire is attached in the appendix.

The project which implemented with Japanese financial support is “Southern Binh Duong water environment implement project”, and it was divided into two phases. In the first phase, a sewage treatment plant was constructed, and sewer network is developed in Thu Dau Mot city. In the second phase, further sewer network was expanded in Thu Dau Mot city, and a sewage treatment plant and sewer network were developed in Thuan An city. Details of each treatment plants is stated below.

Table 12 Basic information of the project in Binh Duong Province

Item		Unit	Quantity/Result
Service area		ha	1,191
Length of Sewer			280 km (1 st stage: 180 km; 2 nd stage: 100km) Main trunk Φ(400-1200mm) = 15,516m Force main Φ(200-600mm) = 6,144m Branch line Φ(200-315mm) = 54,560m Tertiary pipe line Φ(110-160mm) = 116,205m
Pumping station		Number	14
Investment cost	Total	VND	2,077,090 billion VND (89,681,632,452USD)
Financial resources	Vietnam	VND	267,592 billion VND (11,553,706,094USD)
	JICA	VND	1,809,498 billion VND (78,127,926,357USD)
Year	Start of construction		2011 (Phase 1)
	Start of operation		2013 (Phase 1)

The provided information related to the implementation of house connection and development of tertiary pipe are summarized below.

- 1) The legal system is house connection regulation No. 1540/QĐ-UBND dated 25th June 2013 issued by Binh Duong PPC
- 2) About 35% of house connection work in Thu Dau Mot City and about 6 % of that in Thuan Provincial Town have been finished, and they will reach 70% within 2018. Domestic sewage can be discharged to sewer pipes directly. Also, septic tanks can be demolished or backfilled after the tertiary sewer and connection box had been installed.

Table 13 House connection ratio in Binh Duong Province

	Total household number	Connection household number	Connection ratio (%)
Thu Dau Mot City	15,055	5,150	34.2
Thuan Provincial Town	19,587	1,228	6.3
Total	34,642	6,378	18.4

- 3) BIWASE has a department of PRs which focuses on the promotion of house connection. Also, BIWASE implements the annual competition contest among districts and introduces the award and penalty system. It will encourage them to proceed the activities.
- 4) PRs activities have been implemented through local TV program, radio program and seminar in high school.
- 5) WWTP Enterprise was established for promotion of house connection, also it is an organization in charge of management, operation and maintenance of the sewerage system in long term
- 6) Actual cost for house connection is 350,000 – 500,000 VND/m including demolition and installation work. BIWASE has loan and subsidy system from social association to promote the house connection. Survey, design and cost estimation works are all covered by BIWASE. Subsidy ratio for whole cost of house connection work is shown in Table 14.

Table 14 Subsidy rate for whole house connection work

Categories	Subsidy
Vietnamese heroic mother	100 %
Poor households certified by local authority	30 %

- 7) 10 % of water supply tariff is collected as environmental protection fee. BIWASE has a road map to increase the sewerage tariff by 2020.

Also, related documents shown below are obtained in this survey.

- House connection regulation No. 1540/QĐ-UBND dated 25th June 2013 issued by Binh Duong PPC (see appendix)
- Joint press release by embassy of Japan in Vietnam and JICA Vietnam office (see appendix)
- Consulting engineers AJCE Bulletin Vol.38 No.3 2015
- Press release about phase 2 project by KOBELCO that is Japanese facility supplier. (KOBELCO provided wastewater treatment facilities)

7.3.2 Site visit

(1) House connection and tertiary pipe

House connection and tertiary pipe installation was under construction. Not only PE type connection box but also cast-iron cover box has been installed. The material of connection box installed in phase 1 is concrete, phase 2 is PVC. House connection pipe is PVC.

The detail information of pipe installation conducted in phase 2 was acquired and summarized in Table 15.

Table 15 Pipe installation in phase 2

	Thuan An	Thu Dau Mot	Sum
Main pipe (gravity flow)	66 km (Φ255~1200mm)	38 km (Φ200~630mm)	104 km (Φ255~1200mm)
Force Main (pressure flow)	8 km (Φ110~400mm)	5 km (Φ110~450mm)	13 km (Φ110~450mm)
Branch sewer	196 km (Φ110~160mm)	153 km (Φ110~160mm)	349 km (Φ110~160mm)
Sum	270 km (Φ110~1200mm)	196 km (Φ110~630mm)	466 km (Φ110~1200mm)



Cast-iron cover



Inside of manhole



House connection work



Pipes for house connection



House connection work (inside of the house)



Tile is changed after the construction.



Figure 13 House connection work in Binh Duong province

(2) Sewage treatment plant

We visited two sewage treatment plants. Plant in Thu Dau Mot city is the first plant functioning in collection and treatment of domestic wastewater in Binh Duong province.

Table 16 Basic information of sewage treatment plant

	Plant in Thu Dau Mot city	Plant in Thuan An city
Capacity	17,650 m ³ /day	17,000 m ³ /day (planned to expand to 51,000 m ³ /day)
Treatment method	Advanced sequencing batch reactor (ASBR)	Advanced sequencing batch reactor (ASBR)
Start of construction	2011	2013
Start of operation	2013	2017
Total investment cost	1,900 billion VND (82,035,493USD)	2,475 billion VND (106,862,023USD)
Catchment area	1,191 ha	3,163 ha



Grit chamber



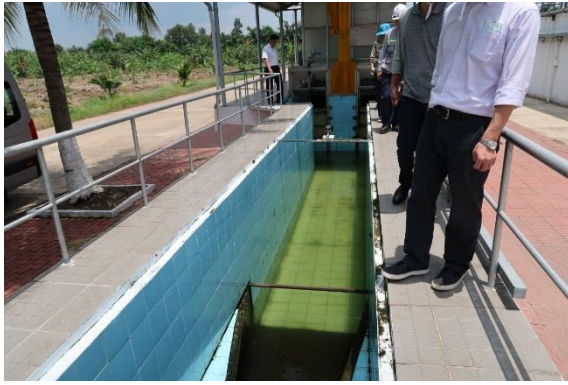
Grit chamber



ASBR tank



ASBR tank



Disinfection pond



Disinfection pond



Outlet



Outlet



Sludge treatment building



Dehydrator



Dehydrator



Dewatered sludge

Figure 14 Sewage treatment plant in Thu Dau Mot city



Screen



Screen



Aeration tank



Aeration tank



Aeration tank



Dehydrator



Deodorizing machine



Deodorizing machine

Figure 15 Sewage treatment plant in Thuan An city

8. SUMMARY OF SURVEY

8.1 Regulations

House connection is regulated in Decree No. 80. (Decree No. 80 is attached in appendix) Based on Article 30 ~ 35 as shown below, it seems that local government legal systems such as Da Lat city and Binh Duong province were established based on these articles of Decree 80.

The legal system of Da Lat city is Decision No. 26/2016/QĐ-UBND dated April 6th 2016 by Chairman of Lam Dong PPC on stipulation of sewerage management in Lam Dong area. Binh Duong province has house connection regulation No. 1540/QĐ-UBND dated 25th June 2013 issued by Binh Duong PPC.

In These local legal systems, not only specifications of connecting work but also financial support policy is regulated. For example, in Da Lat city, specification of house connection is stated in Article 7~10, and time of connection is mentioned in Article 11 which says that households are required to make proposal for connection within 24 months since tertiary sewer system is put into operation. Connection support policy is in Article 13. In Binh Duong province, particular regulations for house connection is in chapter II, which includes connection fee and exemption policy. These local regulations are also in the appendix.

Chapter IV

CONNECTION OF WATER DRAINAGE SYSTEMS

Article 30. Connection of water drainage systems

1. The connection of water drainage systems must ensure that:

a/ Wastewater is collected and treated up to prescribed standards and technical regulations before being discharged into the environment;

b/ The volume of wastewater infiltrating into the earth or flowing into other receiving waters is limited to the utmost.

2. All discharging entities located within a network of rainwater-and wastewater-collecting pipelines and culverts shall be connected to water drainage systems except the case of connection exemption prescribed in Article 35 of this Decree.

3. A concentrated rural residential area or an industrial park that is connected to an urban water drainage system is regarded as an entity using urban water drainage services and shall comply with connection regulations of the water drainage system.

Article 31. Water drainage system connection requirements

1. Connection boxes are determined as lying on water-collecting lines of the water drainage system at the positions of connection points and on the public land adjacent to private land of each discharging entity.

2. All discharging entities shall build water drainage pipelines within their private land areas and connect them to connection boxes.

3. The construction and installation of water drainage systems within the premises of construction works and houses of discharging entities must comply with current technical regulations, prescribed connection requirements and connection agreements.

4. Water drainage system owners shall invest in the construction of water drainage systems which include networks of collecting and conducting water from connection boxes to culverts of grades 3, 2 and 1.

Article 32. Provisions on wastewater discharge at connection points

1. For domestic wastewater: Discharging entities may discharge directly into water drainage systems at connection points.

2. For other wastewater: Discharging entities must have their own systems to collect and preliminarily treat wastewater according to technical regulations, connection regulations and connection agreements before discharging it into connection points.

Article 33. Contents of connection regulations

1. Connection regulations aim to ensure that connection is made upon implementation of investment projects to build new water drainage systems or expand the coverage of existing water drainage services.

2. Connection regulations include:

a/ Regulations on connection points;

b/ Requirements on elevations of connection points;

c/ Regulations on connection boxes;

d/ Connection time;

dd/ Quality and volume of wastewater discharged into connection points;

e/ Funds for and policies to support and promote connection;

g/ Connection-related financial obligations of water drainage system owners and discharging entities;

h/ Rights and responsibilities of involved parties and coordination mechanism.

3. Regulations on water drainage system connection shall be notified to residential communities within the concerned area.

4. Connection regulations are a content of local water drainage regulations promulgated by provincial-level People's Committees.

Article 34. Support for connection to water drainage systems

1. Support for connection aims to promote the connection of wastewater from discharging entities to collecting networks of water drainage systems; ensure thorough collection of wastewater and operation of wastewater treatment plants according to their design capacity; and ensure efficiency of the investment in water drainage system construction.

2. Beneficiaries of support: Households with merits and poor families meeting criteria prescribed by the Prime Minister; and households making connection immediately upon request. Provincial-level People's Committees shall consider and decide on identification of households entitled to support.

3. Modes of support:

a/ To support some or all expenses for installation from connection boxes to water drainage pipelines within the private land of households;

b/ Funds for support come from local budgets, investment projects or water drainage units.

4. Based on specific local conditions, owners shall decide on the mode and level of connection support for specific beneficiaries.

Article 35. Connection agreement and connection exemption

1. Connection agreement means a written agreement between a water drainage unit and a discharging entity on the connection position, technical requirements of the connection point, connection time, and quality and volume of water discharged into the connection point.

2. Cases exempt from connection into water drainage systems:

a/ The receiving waters is near while the wastewater quality satisfies environmental sanitation requirements and connection to a combined water drainage system may result in a unreasonable financial burden for the discharging entity;

b/ In the area, there is no collecting network of centralized water drainage systems.

Also, according to article 47 of decree No.80, water drainage master plans for which the design tasks have not yet been approved, they shall be appraised and approved under this decree. Thus, the regulation of house connection must be included in master plans. Article 47 is shown below.

Chapter VII
IMPLEMENTATION PROVISIONS

Article 47. Transitional handling

1. For water drainage master plans for which the design tasks have been approved and which have been elaborated before the effective date of this Decree, they shall be appraised and approved under the Government's Decree No. 88/2007/ND-CP of May 28, 2007, on water drainage in urban areas and industrial parks. Water drainage master plans for which the design tasks have not yet been approved, they shall be appraised and approved under this Decree.

2. In localities where provincial-level People's Committees are collecting water drainage charges under water drainage charge adjustment roadmaps prescribed in the Government's Decree No. 88/2007/ND-CP of May 28, 2007, on water drainage in urban areas and industrial parks, they may continue to collect these charges until the subsequent adjustment of water drainage charges. The subsequent adjustment of water drainage charges must comply with this Decree's provisions on water drainage charge rates.

8.2 Implementation agency of house connection

The responsibility for implementation of house connection is shown in the Table 17. Da Lat city and Binh Duong province conduct construction by themselves as well as supervision. On the other hand, Buon Me Thuot city entrusts construction work to the private companies that were trained for connection works.

Table 17 Implementation agency of house connection

City / Province	Supervisor	Contractor
Buon Me Thuot city	Dak Lak Urban & Environment JSC	Private contractor
Da Lat city	LAWACO	LAWACO
Binh Duong province	BIWASE	BIWASE

8.3 House connection ratio

The ratio of house connection is summarized in Table 18. The ratio is calculated by the following formula.

$$\text{House connection ratio} = \frac{\text{Number of connected houses}}{\text{Number of target houses}}$$

Table 18 House connection ratio

City / Province	House connection ratio
Buon Me Thuot city	50 %
Da Lat city	60 %
Binh Duong province	35 % in Thu Dau Mot City 7 % in Thuan Provincial Town (They will reach 70 % within 2018 respectively)

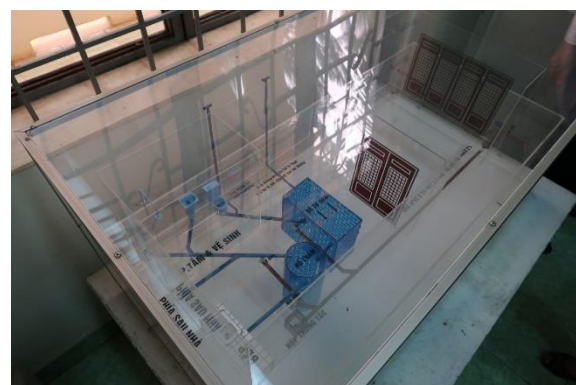
8.4 Effort for promoting house connection

All of 3 cities / province have made intense and effective efforts on public relations. They have patiently counited to explain to residents by holding explanatory sessions and directly visiting each household. In Buon Me Thuot City, 50% of PMU officers work on the public relations activity. In Binh Duong Province, BIWASE has a department of PRs which focuses on the promotion of house connection. Also, BIWASE implements the annual competition contest among districts and introduces the award and penalty system. It will encourage them to proceed the activities.

Explanatory board and models as shown below were used to get residents' understanding. Also, LAWACO and BIWASE had conducted their PR activities through local TV and radio programs.



Explanatory board in Buon Me Thuot City



Model of house connection in Buon Me Thuot City



Model in Dat Lat city

Figure 16 Tools of PR activity

8.5 Financial support system

Each city has loan and subsidy system to promote the house connection. Their systems are summarized in the Table 19.

Table 19 Financial support system

City / Province	Financial support system
Buon Me Thuot city	If residential people implement house connection work within two years after sewer pipes are installed, they can receive a certain amount of subsidy from CPC (1,200,000 VND).
Da Lat city	If residential people implement house connection during the project period, they can receive the subsidy covering 100% of necessary cost. The first 200 households registered for connection after project completion will be present 12m of pipe D114.
Binh Duong province	BIWASE has loan and subsidy system from social association to promote the house connection.

According to the interview with BIWASE, the construction cost of pipe installation is 350,000 – 500,000 VND/m including demolishment.

8.6 Septic tank

Domestic sewage can be discharged to sewer pipes directly. Also, septic tanks can be demolished or backfilled after the tertiary sewer and connection box had been installed.

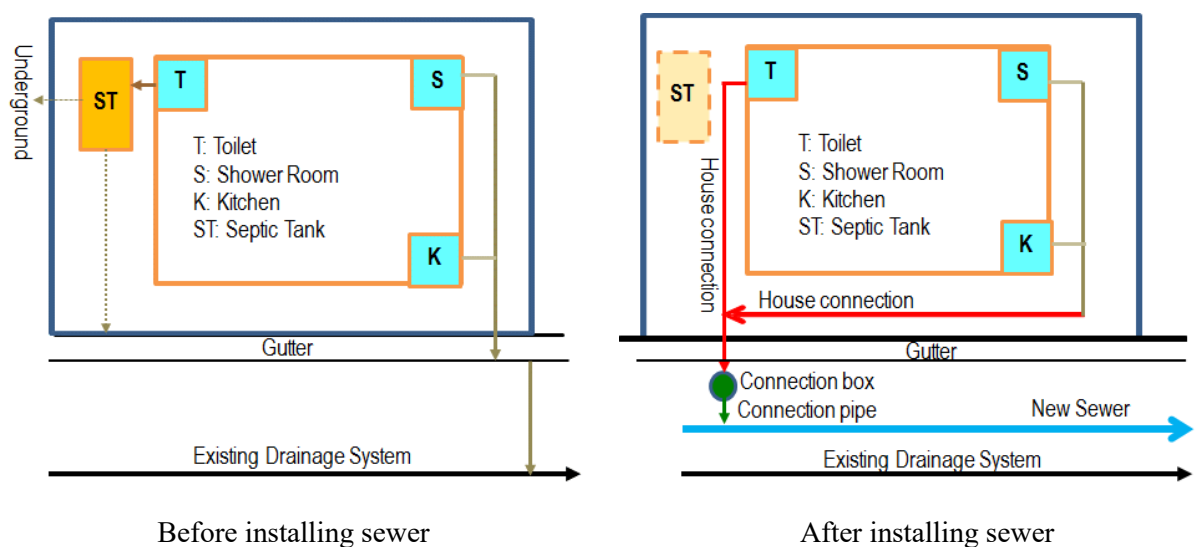


Figure 17 Septic tank

8.7 Impact on environment

The obvious positive effect on the environment was observed in the survey. The river in Da Lat city was visibly clean although the data of water quality was not obtained. Additionally, the influent BOD is more than 200mg/L in the three target cities/province. We can conclude that the three target cities/province are headed straightly for achievement of the authentic sewerage system.



River in Da Lat city



High concentrated sewage in Buon Me Thuot city

Figure 18 Example of positive impact

The survey result is summarized in Table 20.

Table 20 Summary of the survey

Item	Buon Me Thuot City	Da Lat City	Binh Duong Province
1. Basic information of existing sewerage system	Project target area: Urban area in Buon Me Thuot City Length of sewer network: 97km Year of commencement: 2000 Capacity of STP: Phase-1: 8,000m ³ /d (Aeration pond), Phase-2: 12,000m ³ /d (MBBR method)	Project target area: Urban area in Da Lat City Length of sewer network: 130km Year of commencement: 2004 Capacity of STP: 12,400m ³ /d (Trickling filter method)	Project target area: Whole of southern Binh Duong Province Length of sewer network: 470km Year of commencement: 2013 Capacity of STP: Approximately 40,000m ³ /d (2 x SBR method)
2. House connection ratio	Target number of households to be connected in the Phase-1: 5,500; Phase-2: 9,000 90% of house connection has been achieved in Phase-1	Number of already connected houses: Phase-1=8,000, Phase-2=1,500 Target number of houses in the Project = 15,000 → 60% of house connection has been achieved.	35% of house connection work in Thu Dau Mot City and about 6 % of that in Thuan Provincial Town have been achieved, and 70% is expected to be achieved within 2018.
3. Effort for promoting house connection	PMU together with CPC implemented the PRs for each district, and 50% of PMU officers worked on the PRs activity with use of model of house connection and explanatory board exhibited in STP. However, it is difficult to promote house connection works for old houses since they still hesitate to break their floor.	LAWACO implemented the PRs in the evening or night once or twice for each district with use of the descriptive model and panel exhibited in the STP. Also, PR activities were implemented through local TV and radio programs.	BIWASE has a department of PRs who focuses on the promotion of house connection. Also, BIWASE implements the annual competition among districts and introduces the award and penalty system. Additionally, PR activities are implemented through local TV program, radio program and seminar in high school.
4. How to handle septic tank	Basically, domestic sewage can be discharged to sewer pipes directly and septic tank can be demolished or backfilled after the tertiary sewer and connection box are installed. Also, it is not necessary to install septic tank for new household or they can install temporary infiltration hole during waiting for construction of connection box under the Project.		
5. Financial supporting system	If residential people implement house connection work within two years after sewer pipes are installed, they can receive a certain amount of subsidy from CPC (1,200,000 VND).	If residential people implement house connection during the project period, they can receive the subsidy covering 100% of necessary cost. Otherwise, they have to bear all cost.	Actual cost for house connection is 350,000 – 500,000 VND/m including demolition and installation work. BIWASE has loan and subsidy system from social association to promote the house connection.
6. Material of equipment for house connection	Connection box: Concrete (Phase-1), PVC (Phase-2) Cover of connection box: Concrete House connection pipe: PVC	Connection box: PVC, Cover of connection box: Concrete House connection pipe: PVC	Connection box: Concrete (Phase-1), PVC (Phase-2) Cover of connection box: Cast iron House connection pipe: PVC
7. Sewerage tariff system	Currently, the sewerage tariff has not been formulated but only 10% of water supply fee is collected as environmental protection fee. Therefore, the city is preparing the road map to formulate the sewerage tariff.	Sewerage unit price in the project covered area is 6,261 VND/m ³ , of which, residents have to pay 3,198 VND/m ³ and 3,063 VND/m ³ will be subsidized by stage budget. For the un-connected households, 500 VND/m ³ of water supply tariff is collected as environmental protection cost.	Currently, only 10% of water supply tariff is collected as environmental protection fee, however, BIWASE has a road map to increase the sewerage tariff until 2020.

9. PROPOSAL FOR THE FUTURE DIRECTION OF TRAINING ACTIVITIES

Through the survey, the importance of implementing house connection and installing tertiary pipes was confirmed. It gives large impact on improving water environment. Thus, house connection and tertiary pipe installation works should be conducted regardless of sewer system, in other words it is necessary even in the combined sewer system area such as Hanoi and HCMC.

Considering these survey result, matters that can be incorporated into VSC training course are stated below.

1. To introduce the importance to develop tertiary pipes and house-connection in Vietnam.

Lecturer should emphasize the following issues in the training course.

- (a) The separated sewer system is desirable and in principle adopted from the environmental point of view because it can prevent water pollution more effectively in comparison with combined sewer one, while the separate sewer system requires cooperation and understanding of the residents indispensably, the construction cost is more expensive/ construction period is longer.
- (b) It should be considered carefully to adopt the separate sewer system carefully in the heavy rain area, because the dilution of sewage with rain water cannot be avoided.

2. To introduce the detailed pipe design assistance software as Japanese new technology

Designing tertiary pipes and house connection for a whole city is an enormous amount of work. Japanese pipe design software helps to speed up its works, so it should be introduced in the training course.

3. To introduce database system for effective and efficient operation, maintenance and administration of pipes and house-connection facilities

First of all, it is essential to grasp the existing pipe system. Therefore, by installing database system, construction plan can be made effectively.

4. To Install Japanese new technologies and sewerage facilities in CUWC by the end of 2018

An exhibition room to display Japanese new technologies that will contribute to improving sewer system is under preparation in VSC project.

5. Future Plan for small-scale separate sewer system in CUWC using for training which will be expected in second phase of project

In VSC project, master plan of small scale separate sewer system in CUWC is being planned. It will contribute to helping not only trainees but also lecturers and CPs of CUWC understand the separate sewage system.

6. Preparation of the establishment plan of training center in CUWC

In VSC project, training center in CUWC is planned to be established for the sustainable running of training course.