APPENDIX-F

Summary Report of Each Pilot Training Course

1. SCHEDULE OF PILOT TRAINING COURSE

First and second pilot training course were conducted in the detailed planning phase. From the third and 11th pilot training courses were conducted in this phase. The schedule of pilot training courses is shown in Table 1.1.

Table 1.1 Schedule of Pilot Training Course

No.	Date	Contents	Venue	Note
No.1	2016/8/9～10	Project management	Hanoi	The detailed planning phase
No.2	2016/11/15～18	Plan & Design	Hanoi	〃
No.3	2017/10/23～27	Planning course	Hanoi	The implementation phase
No.4	2018/4/9～13	Planning course	Hue	〃
No.5	2018/7/9～12	Planning course	Nha Trang	〃
No.6	2018/10/9～12	Planning course	Ho Chi Minh	〃
No.7	2018/12/4～6	Planning course	Can Tho	〃
No.8	2019/3/26～28	Preliminary design course	Hanoi	〃
No.9	2019/7/17～19	Preliminary design course	Ho Chi Minh	〃
No.10	2019/9/23～25	Planning course	Lao Cai	〃
No.11	2019/10/30～11/1	Preliminary design course	Nha Trang	〃

Source: JICA Consultant Team

The outline of 9 pilot training courses are stated as follows. The details are in the electric report data which is submitted.

2. THIRD PILOT TRAINING COURSE (PLANNING COURSE)

2.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 2.1.

Table 2.1 Outline of the Training

Date	Venue	Target Area	Target Trainee
Oct. 23rd ~27th, 2017	CUWC (Hanoi)	North are	Local government employee

Source: JICA Consultant Team

2.2 Program of the Training

The program of the 3rd training course is shown in Table 2.2

Table 2.2 Program of the 3rd Training Course

Date	Time	Subject	Lecturer
Oct. 23rd (Mon)	14:00 –	Registration Distribution of documents	
Oct. 24th (Tue)	8:30 – 9:00	Opening ceremony	
	9:00 – 11:30	Outline of sewerage works	MSc. Tran Thi Thao Huong (*1)
	13:00 – 16:15	Structure of sewerage and drainage master plan	Dr. Do Thuan An (*2)
	16:15 – 17:00	Discussion	
Oct. 25th (Wed)	8:30 – 11:30	Basic planning for sewerage pipe network and its exercise	Dr. Do Thuan An (*2)

	13:30 – 14:30	Introduction of new technologies	Mr. Tamaki Mori (*3)
	14:45 – 16:15	Basic planning for sewerage pipe network and its exercise	Dr. Do Thuan An (*2)
	16:15 – 17:00	Discussion	
Oct. 26th (Thu)	8:30 – 11:30	Explanation of Decree 16	Mr. Nguyen Ngoc Duong (*4)
	13:30 – 15:00	Structure of Feasibility Study	Mr. Takeki Kajiura (*5)
	15:00 – 17:00	Discussion	
Oct. 27th (Fri)	8:30 – 10:30	Final discussion	
	10:30 – 11:15	Closing ceremony and presentation of certificate	
	11:30 –	Farewell party	

*1: Rank of Deputy Direction General, Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction

*2: Head of Department of Environmental Engineering, University of Water Resource

*3: JICA Long-term Expert

*4: Deputy Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*5: JICA Consultant Team (Nippon Koei)

Source: JICA Consultant Team

2.3 Participants

The participants and their organizations are shown in Table 2.3.

Table 2.3 Participants of the 3rd Training Course

Province/ City	Organization	Number
Bac Giang Prov.	Bac Giang City	2
Cao Bang Prov.	DOC	1
Lang Son Prov.	DOC	3
Ha Giang Prov.	DOC	1
Hoa Binh Prov.	Hoa Binh City	3
	DOC	3
Phu Tho Prov.	DOC	1
Lai Chau Prov.	Lai Chau CPC	1
	Lai Chau City	1
Dien Bien Prov.	Dien Bien Province	2
Bac Ninh Prov.	DOC	1
Vinh Phuc Prov.	Construction Planning Institute	3
Quang Ninh Prov.	Uong Bi City	1
	Ha Long City	1
	Ban QLDU	1
Hai Duong Prov.	DOC	2
Hung Yen Prov.	Hung Yen City	3
	DOC	2
Ha Nam Prov.	Phu Ly City	1
	DOC	1
Nam Dinh Prov.	DOC	1
	Nam Dinh City	1
Ninh Binh Prov.	Construction Planning Institute of	3

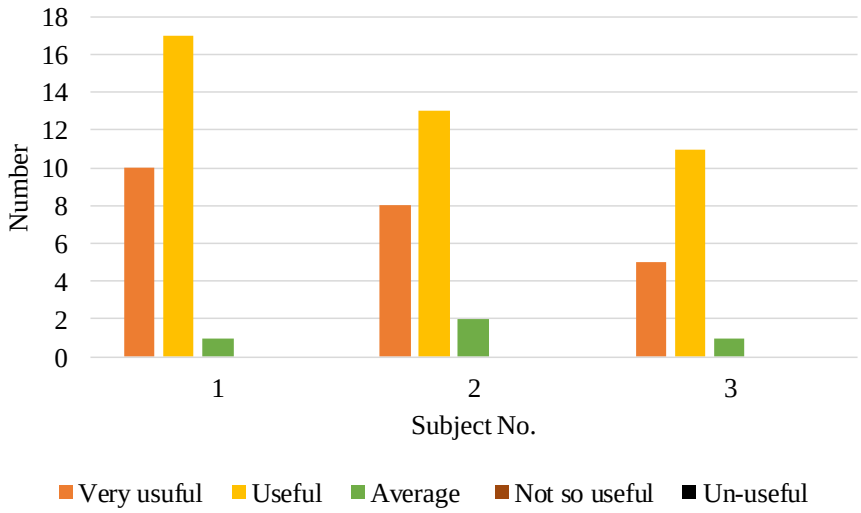
	Ninh Binh Province	
	DOC	1
Total		40

Source: JICA Consultant Team

2.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 2.1. The details are in the training report attached in the electric report data.



No.	Subject
1	Outline of Sewage Works and Structure of Sewerage and Drainage Master Plan
2	Basic Planning for Sewerage Pipe Network and Its Exercise
3	Feasibility Study in Vietnam

Source: JICA Consultant Team

Figure 2.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 2.4 Request and Comments from the Trainees

Item	Contents
Request	・ Sewerage planning including the pipeline should be explained precisely.
Subject to be added	・ Lectures should include further information of sewerage network in urban areas. ・ Please provide training subject on design of sewer network and WWTP. ・ Provide training on Technical Standards for O&M of WWTP ・ Case study in Vietnam ・ How to make used of software for sewer pipeline design ・ Site visit to some WWTPs now under operation should be organized

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- A 15-minute break was taken in the middle of lecture in both AM and PM sessions; however, the trainees did not come back to the room on time, so the lecture started late. Punctual lecture operation was requested by some trainees. Operation staff should pay attention next time so that lectures run on time.
- Trainees requested that the figure and table should be illustrated in the textbook for better understanding. Therefore, presentation documents will be included in the textbook next time.

3. FORTH PILOT TRAINING COURSE (PLANNING COURSE)

3.1.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 3.1.

Table 3.1 Outline of the Training

Date	Venue	Target Area	Target Trainee
Apr. 9th ~13th, 2018	Duh Tay Hotel (Hue)	Middle are	Local government employee

Source: JICA Consultant Team

3.1.2 Program of the Training

The program of the 4th training course is shown in Table 3.2

Table 3.2 Program of the 4th Training Course

Date	Time	Subject	Lecturer
Apr. 9th (Mon)	PM	Registration Distribution of documents	
10th (Tue)	8:30 – 9:00	Opening ceremony	
	9:00 – 10:30	Management and Planning of Sewerage & Drainage – Wastewater treatment in Viet Nam	BE, MSc. Tran Thi Thao Huong (*1)
	10:30 – 10:45	Tea Break	
	10:45 – 12:00	Decree 16 for project	Mr. Nguyen Ngoc Duong (*2)
	13:30 – 15:00	Structure of sewerage and drainage master plan	Dr. Do Thuan An (*3)
	15:00 – 15:15	Tea Break	
	15:15 – 17:00	Continue to lecture	Dr. Do Thuan An (*3)
11th (Wed)	8:30 – 10:00	Basic planning for sewerage pipe network	Dr. Do Thuan An (*3)
	10:00 – 10:15	Tea Break	
	10:15 – 12:00	Feasibility study in Vietnam (Case study of WB Phang Rang Project)	Mr. Kien Hung (*4)
	13: 30 – 15:00	New Technology-1 Pipe jacking and Micro tunneling	Iseki Poly-Tech, Inc.
	15:00 – 15:15	Tea Break	
	15:15 – 16:45	Small type manhole and Plastic material for flood control facility	Sekisui Chemical Co., Ltd.
	16:45 – 17:00	Q & A	
12th (Thu)	8:30 – 9:00	New Technology-2 CCTV Camera System	Ms. Vu Thi Hoai An (*5)
	9:00 – 9:30	Sewerage & drainage database system	Tamano Consultants Co., Ltd.
	9:30 – 10:00	Auto flushing device for sewer	Nippon Koei Co., Ltd.
	10:00 – 10:15	Tea Break	
	10:15 – 11:45	Lesson learned from WB report	Dr. Do Thuan An (*3)

	13:15 – 14:45	Discussion session based on WB report	Dr. Do Thuan An (*3)
	14:45 – 15:00	Tea Break	
	15:00 – 17:00	Exercise for preparation of MP & FS (Sewerage planning and pipe network)	Mr. Bui Manh Dung (*6)
13th (Fri)	6:30 – 9:30	Move to Hoi An City	
	9:30 – 12:00	Site visit to Hoi An JICA project WWTP	Meta Water Co., Ltd.
	13:00 – 14:00	Move to Da Nang City	
	14:00 – 15:30	Site visit to Phu Loc STP and Hoa Xuan WWTP	
	15:30 – 17:00	Move to Lam Anh Hotel, Da Nang	
	17:00 –	Closing ceremony and Farewell party	

*1: Rank of Deputy Direction General, Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction

*2: Deputy Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*3: Head of Department of Environmental Engineering, University of Water Resource cum Vietnam Water, Sanitation and Environment JSC

*4: Director of Vietnam Water, Sanitation and Environment JSC Ho Chi Minh City Branch

*5: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE – CUWC

*6: Administration of Technical Infrastructure (ATI), Ministry of Construction

Source: JICA Consultant Team

3.1.3 Participants

The participants and their organizations are shown in Table 3.3.

Table 3.3 Participants of the 4th Training Course

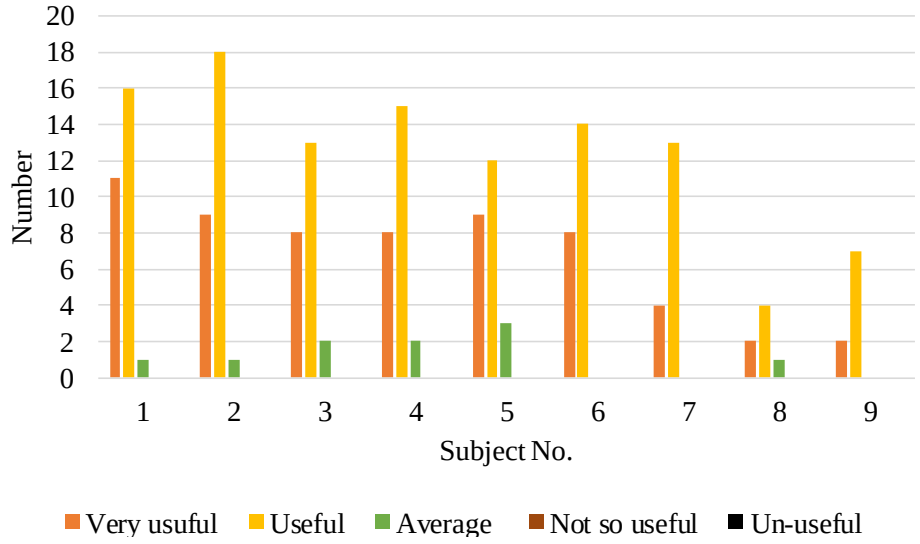
Province/ City	Organization	Number
Nghe An Prov.	DOC	1
	Vinh CPC	4
Ha Tinh Prov.	Hong Linh Town PC	3
Quan Binh Prov.	DOC	3
	Dong Hoi CPC	1
	Dong Hoi PMU	2
Quang Tri Prov.	DOC	2
	Dong Ha CPC	2
Thua Thuen Hue Prov.	Hue CPC	2
	Hue HEPCO	2
Da Nang City	Da Nang PIIP	2
Quang Nam Prov.	Tam Ky CPC	2
	Hoi An City Construction and Investment PMU	4
Total		30

Source: JICA Consultant Team

3.1.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 3.1. The details are in the training report attached in the electric report data.



No.	Subject
1	Management and Planning of Sewerage & Drainage – Wastewater Treatment in Viet Nam
2	Decree No.16/2016/NĐ-CP on Management of Utilization of ODA funds
3	Sewerage & Drainage Master Plan
4	Basic Planning of Sewerage Pipe Network
5	Feasibility Study – Case Study of Phan Rang-Thap Cham Project
6	New Technology 1 (Pipe Jacking and Micro Tunneling; Small Pipes, Cross-Wave Material and PVC Manhole)
7	New Technology 2 (CCTV, Database and Mapping for Sewerage and Drainage)
8	Lessons Learned from WB Report – Discussion
9	Exercise for MP & FS

Source: JICA Consultant Team

Figure 3.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 3.4 Request and Comments from the Trainees

Item	Contents
Request	・ New technology: price and its applicable feasibility in Viet Nam should be clarified; Contents of "New technology" should consist of much more information instead of existing only "Introduction of technology" ・ The time for discussion among the trainees should be taken
Subject to be added	・ Drainage and sewerage master plan for climate change ・ Model case of sewerage development in Vietnam. ・ Effective O&M method ・ Additional new technology introduction ・ Method of project development and evaluation/approval of master plan

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- Trainees visited the STP in Hoi An, which is under construction with the Japanese grant aid. Its treatment method is developed in Japan. However, it took 3 hours by car to reach, so the selection of site should be considered.
- The VSC team would like to prevent from shortening the lecture time of the sewerage system by extending the lecture of new technology. On the other hand, there is a request from the trainees to extend the lecture on new technology. It is necessary to consider the best schedule which can satisfy the goal of this training and meet the request from the trainees.
- The textbook is translated from English to Vietnamese. It was pointed out that some parts are not translated correctly. Therefore, double checking by the translator is conducted; moreover, technical review by local consultant is done.

4. FIFTH PILOT TRAINING COURSE (PLANNING COURSE)

4.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 4.1.

Table 4.1 Outline of the Training

Date	Venue	Target Area	Target Trainee
Jul. 9th ~12th, 2018	Khanh Hoa Province's Guest House (Nha Trang)	Middle southern area	Local government employee

Source: JICA Consultant Team

4.2 Program of the Training

The program of the 5th training course is shown in Table 4.2.

Table 4.2 Program of the 5th Training Course

Date	Time	Subject	Lecturer
Jul. 9th (Mon)	14:00 – 16:00	Registration Distribution of documents	
10th (Tue)	08:00 – 08:30	Opening ceremony	
	08:30 – 09:45	Management and Planning of Sewerage & Drainage – Wastewater treatment in Viet Nam	BE, MSc. Tran Thi Thao Huong (*1)
	09:45 – 10:15	Tea Break	
	10:15 – 11:00	Decree 16 for project	Mr. Nguyen Ngoc Duong (*2)
	11:00 – 12:15	Structure of sewerage and drainage master plan	Dr. Do Thuan An (*3)
	12:15 – 14:00	Lunch	
	14:00 – 14:45	Preparation of master plan in Nam Dinh	Mr. Do Manh Quan (*4)
	14:45 – 15:30	Critical issues in the Vietnamese Sewerage System and necessity of house-connection and tertiary pipe	Mr. Tamaki Mori (*5)
	15:30 – 16:00	Tea Break	
	16:00 – 17:00	Introduction of New Technology (PTF method)	Meta Water Co., Ltd.
11th	08:00 – 09:30		Dr. Do Thuan An (*4)

Date	Time	Subject	Lecturer
(Wed)		Basic planning for sewerage pipe network	
	09:30 – 10:00	Introduction of New Technology (CCTV Camera System)	Ms. Vu Thi Hoai An (*6)
	10:00 – 10:30	Tea Break	
	10:30 – 11:15	Case study of WB coastal cities environmental sanitation project (Nha Trang/ Phang Rang Tap Cham City sub-project)	Mr. Kien Hung (*7) Staff in Phan Rang
	11:15 – 11:45	Provision of basic information of WWTP and point to be considered in Site visit	Staff in Nha Trang Dr. Do Thuan An (*4)
	11:45 – 13:30	Lunch	
	13:30 – 14:00	Move to WWTP in Nha Trang / Phan Rang	
	14:00 – 16:30	Site visit of WWTP in Nha Trang /Phang Rang	
	16:30 – 17:00	Back to the training room	
12th (Thu)	08:00 – 09:00	Introduction of New Technology (Pipe jacking and Micro tunneling)	Iseki Poly-Tech, Inc.
	09:00 – 10:00	Small type manhole and Plastic material for flood control facility	Sekisui Chemical Co., Ltd.
	10:00 – 10:30	Tea Break	
	10:30 – 11:10	Sewerage & drainage database system	Tamano Consultants Co., Ltd.
	11:10 – 12:00	Discussion, Questionnaire	
	12:00 – 14:00	Closing ceremony and Farewell party	

*1: Rank of Deputy Direction General, Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction

*2: Deputy Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*3: Head of Department of Environmental Engineering, University of Water Resource cum Viet Nam Water, Sanitation and Environment JSC

*4: Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*5: JICA Long-term Expert

*6: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE – CUWC

*7: Director of Viet Nam Water, Sanitation and Environment JSC Ho Chi Minh City branch

Source: JICA Consultant Team

4.3 Participants

The participants and their organizations are shown in Table 4.3.

Table 4.3 Participants of the 5th Training Course

Province/ City	Organization	Number
Ninh Thuan Prov.	Ninh Thuan Water Sector Management and Capacity Building PMU	2
	DOC	2
Dak Lak Prov.	DOC	2
	Buon Ma Thuot CPC	2
Binh Thuan Prov.	Lagi CPC	1
	DOC	1

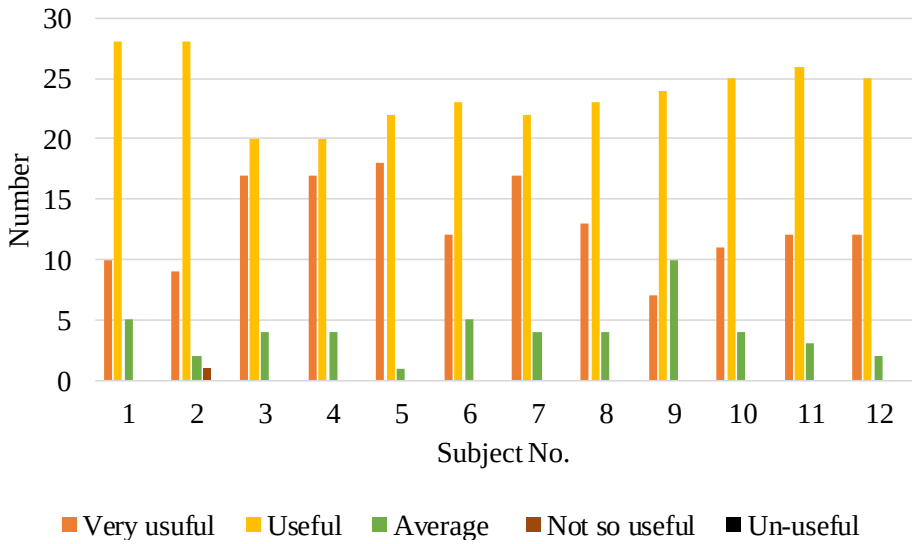
Dak Nong Prov.	DOC	2
Khanh Hoa Prov.	Nha Trang CPC	4
	Nha Trang Public Service PMU	4
	Khanh Hoa Water supply and Sewerage Company	5
	Cam Ranh CPC	2
	Khanh Hoa Province Development PMU	7
	Khanh Hoa DOC	2
Gia Lai Prov.	DOC	1
Binh Dinh Prov.	DOC	2
	Binh Dinh Industrial and Civil Work PMU	1
Phu Yen Prov.	Tuy Hoa CPC	1
Lam Dong Prov.	DOC	2
	Bao Loc CPC	1
	Duc Trong Commune PC	2
Kontum Prov.	DOC	2
Total		48

Source: JICA Consultant Team

4.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 4.1. The details are in the training report attached in the electric report data. Most of the answers were “very useful” or “useful”. It seems that the satisfaction of trainees was high.



No.	Subject
1	Management and Planning of Sewerage & Drainage – Wastewater Treatment in Viet Nam
2	Decree No.16/2016/NĐ-CP on Management of Utilization of ODA funds
3	Sewerage & Drainage Master Plan
4	Nam Dinh City Sewerage & Drainage Master Plan formulation
5	Critical Issues of Sewerage System of Viet Nam; Necessity of Household Connection and Tertiary Network
6	PTF Technology
7	Basic Planning of Sewerage Pipe Network

8	CCTV
9	Feasibility Study – Case Study of Phan Rang-Thap Cham Project
10	Pipe Jacking and Micro Tunneling
11	Small Pipes, Cross-Wave Material and PVC Manhole
12	Database and Mapping for Sewerage and Drainage

Source: JICA Consultant Team

Figure 4.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized below. There were questions about the problems that trainees have encountered in their organizations in the questionnaire.

Table 4.4 Request and Comments from the Trainees

Item	Contents
Request	・ Some of the lectures were too long to have time for Q&A and discussion.
Subject to be added	・ O&M of sewerage and drainage system including GIS ・ Procedure and legal basis for formulation, submission, evaluation and approval of MP; Implementation agencies ・ Method for approaching to donor fund sources for construction of sewerage and drainage system
Problems in the organization	・ It is difficult to improve public awareness for the importance of sewerage; therefore, the implementation of house connection takes a lot of time. ・ The public water body has been damaged because the sewer treatment method is not appropriate. The training is necessary to obtain the knowledge for selecting the most suitable treatment method. ・ There is no MP for sewerage planning. ・ Lack of fund ・ There is no sewerage treatment plan, and sewer is treated by septic tank in each household. ・ Some households and industries illegally drain untreated sewer to the public water body. ・ The contamination of ground water has been caused because sewerage system has not been developed. ・ Draught and flood have happened recently because of the climate change. ・ Countermeasure for odder from rain water collecting pit ・ Regular cleaning of sewer pipes is required.

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- The training course spans four days. However, there is an opinion from the trainees that this period is too long. Therefore, it will be considered to shorten the training period.
- A louder speaker will be prepared for the site visit next time.

5. SIXTH PILOT TRAINING COURSE (PLANNING COURSE)

5.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 5.1.

Table 5.1 Program of the 6th Training Course

Date	Venue	Target Area	Target Trainee
Oct. 9th ~12th, 2018	Guest House T78 (HCMC)	HCMC area	Local government employee

Source: JICA Consultant Team

5.2 Program of the Training

The program of the 6th training course is shown in Table 5.2.

Table 5.2 Program of the 6th Training Course

Date	Time	Subject	Lecturer
Oct. 9th (Tue)	14:00 - 16:00	Registration Distribution of documents	CUWC
10th (Wed)	08:00 - 08:30	Opening ceremony	
	08:30 - 09:45	Management and Planning of Sewerage & Drainage - Wastewater treatment in Viet Nam	BE, MSc. Tran ThiThao Huong (*1) Mr. Bui Manh Dung (*2)
	09:45 - 10:00	Tea Break	
	10:00 - 11:30	Structure of sewerage and drainage master plan	Dr. Do ThuanAn (*3)
	11:30 - 13:15	Lunch	
	13:15 - 13:45	Preparation of master plan in Nam Dinh	Mr. Do Manh Quan (*4)
	13:45 - 14:15	Necessity of house-connection and tertiary pipe for sewerage system project	Mr. Tamaki Mori (*5)
	14:15 - 15:00	Small type manhole and Plastic material for flood control facility	Sekisui Chemical Co., Ltd.
	15:00 - 15:15	Tea Break	
	15:15 - 17:00	Basic planning for sewerage pipe network	Dr. Do ThuanAn (*3)
11th (Thu)	08:00 - 08:45	Introduction of New Technology (Pipe jacking and Micro tunneling)	Iseki Poly-Tech, Inc.
	08:45 - 09:15	Provision of Challenging issue of Pipe jacking and point to be considered in Site visit	HCMC Director
	09:15 - 10:15	Move to Pipe jacking in HCMC	
	10:15 - 11:30	Site visit of Pipe jacking in HCMC	
	11:30 - 13:15	Lunch	
	13:15 - 14:15	Move to Binh Duong	
	14:15 - 15:00	Necessity of PR activity of house-connection	BIWASE
	15:00 - 17:00	Site visit of and house-connection & tertiary pipe and STP in Binh Duong	BIWASE
12th (Fri)	08:00 - 08:45	Introduction of New Technology (CCTV Camera System)	Ms. Vu Thi Hoai An(*6)
	08:45 - 09:30	Introduction of New Technology (PTF method)	Meta Water Co., Ltd.
	09:30 - 09:45	Tea Break	
	09:45 - 10:30	Sewerage & drainage database system	Tamano Consultants Co., Ltd.

Date	Time	Subject	Lecturer
	10:30 - 11:00	Discussion, Questionnaire	
	11:00 - 14:00	Closing ceremony and Farewell party	

*1: Rank of Deputy Direction General, Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction

*2: VSC, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*3: Head of Department of Environmental Engineering, University of Water Resource cum Viet Nam Water, Sanitation and Environment JSC

*4: Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*5: JICA Long-term Expert

*6: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE - CUWC

Source: JICA Consultant Team

5.3 Participants

The participants and their organizations are shown in Table 5.3.

Table 5.3 Participants of the 6th Training Course

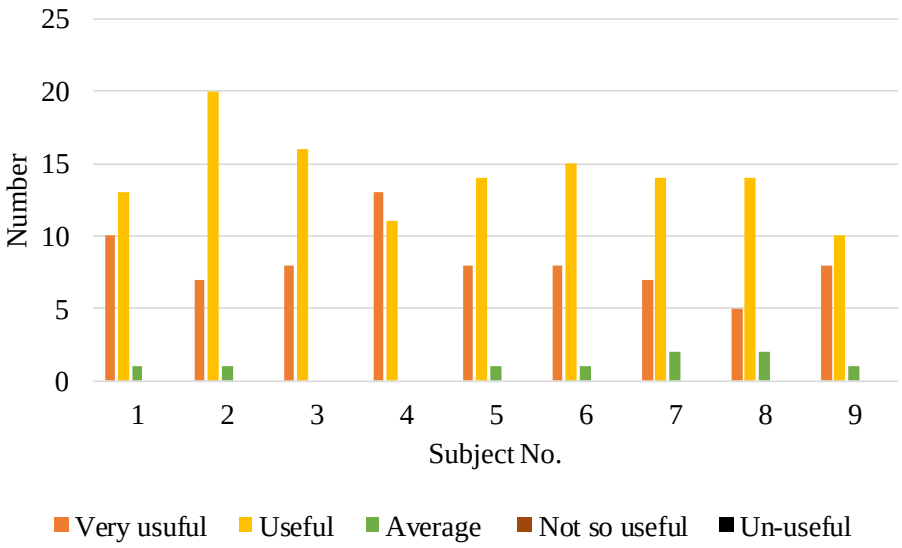
Province/ City	Organization	Number
Binh Duong Prov.	BIWASE	2
	Thuan An CPC	3
Binh Phuoc Prov.	Dong Xoai Town PC	2
Dong Nai Prov.	DOC	2
	Long Khanh City	2
Tay Ninh Prov.	DOC	2
	Tay Ninh CPC	4
HCM City	DOT HCMC	2
	DOC HCMC	1
	HCMC	2
	SCFC	2
	UCCI	2
Long An Prov.	Long An CPC	1
Tien Giang Prov.	Tien Giang DOC	1
	DOC	1
	My Tho city	4
Ben Tre Prov.	Ben Tre CPC	1
	Ben Tre DOC	1
Total		35

Source: JICA Consultant Team

5.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 5.1. The details are in the training report attached in the electric report data. Most of the answers were “very useful” or “useful”. Especially, the number of “very useful” of No. 4, house connection, was the highest. It seems that the trainees were highly satisfied.



No.	Subject
1	Management and Planning of Sewerage & Drainage – Wastewater Treatment in Viet Nam
2	Structure of Sewerage & Drainage Master Plan
3	Preparation of Master Plan in Nam Dinh
4	Neccessity of Household Connection and Tertiary Network
5	Small Type Manhole and Plastic Materials for Flood Control Facility
6	Basic Planning of Sewerage Pipe Network
7	Pipe Jacking and Micro Tunneling
8	PTF Technology
9	Database and Mapping for Sewerage and Drainage

Source: JICA Consultant Team

Figure 5.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized below. There were questions about the problems that the trainees have encountered in their organizations in the questionnaire.

Table 5.4 Request and Comments from the Trainees

Item	Contents
Request	・ Various construction methods were introduced. Each construction cost and period should be explained. ・ Q&A session should be taken at the end of the lecture.
Subject to be added	・ Urban drainage ・ MP for climate change ・ Site visit to construction site ・ Management method of tidal backflow ・ Distribution system for water supply
Problems in the organization	・ Updating and adjustment of sewerage master plan for HCMC up to 2030, vision to 2050 is under implementation. This work should be accelerated to complete before 2020 as a basis for implementation of priority projects of flood control and wastewater treatment for climate change. ・ Institution and law relating to sewerage should be clear.

	・ Water resource pollution ・ Rainwater and grey water are not separated. ・ Financial source has not been allocated for sewerage implementation. ・ Flood ・ The fund for house connection and sewer collecting system is lacking. ・ Untreated sewer flows into the public water body.

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- A Q&A session was done at the end of the day; however, some thought that it should be done at the end of each lecture. Therefore, the program should be changed next time

6. SEVENTH PILOT TRAINING COURSE (PLANNING COURSE)

6.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 6.1.

Table 6.1 Program of the 7th Training Course

Date	Venue	Target Area	Target Trainee
Dec. 4th ~7th, 2018	Vạn Phát Riverside Hotel (Can Tho City)	Southern Mekong Delta area	Local government employee

Source: JICA Consultant Team

6.2 Program of the Training

The program of the 7th training course is shown in Table 6.2.

Table 6.2 Program of the 7th Training Course

Date	Time	Subject	Lecturer
Dec. 2nd (Tue)	15:00 - 17:00	Registration Distribution of documents	CUWC
5th (Wed)	08:00 - 08:30	Opening ceremony	
	08:30 - 09:45	Management and Planning of Sewerage & Drainage - Wastewater treatment in Viet Nam incl.QA	BE, MSc. Tran ThiThao Huong(*1) Mr. Bui Manh Dung (*2)
	09:45 - 10:00	Tea Break	
	10:00 - 11:30	Structure of sewerage and drainage master plan incl.QA	Dr. Do ThuanAn(*3)
	11:30 - 13:15	Lunch	
	13:15 - 14:00	Separated Sewerage System incl.QA	Mr. Pham Thanh Dat (*4)
	14:00 - 14:45	Preparation of master plan in Nam Dinh incl.QA	Mr. Do Manh Quan (*5)
	14:45 - 15:15	Tea Break	
	15:15 - 17:00	Basic planning for sewerage pipe network incl.QA	Dr. Do Thuan An(*3)
6th (Thu)	08:00 – 09:00	Introduction of New Technology (Pipe jacking and Micro tunneling) incl.QA	Iseki Poly-Tech, Inc.
	09:00 - 10:00	Introduction of New Technology (Pipe design assistant system) incl.QA	Pipe Design, Inc.

Date	Time	Subject	Lecturer
	10:00 - 10:30	Tea Break	
	10:30 - 11:30	Introduction of New Technology (PTF method) incl.QA	Meta Water Co., Ltd.
	11:30 - 13:30	Lunch	
	13:30 - 14:00	Brief explanation of STP of WASSCO incl.QA	Can Tho WASSCO
	14:00 - 14:45	Move to STP	
	14:45 - 17:00	Site visit of STP in Can Tho and house-connection if possible	
7th (Fri)	08:00 - 08:45	Introduction of New Technology (CCTV Camera System) incl.QA	Ms. Vu Thi Hoai An(*6)
	08:45 - 09:45	Sewerage & drainage database system incl.QA	Tamano Consultants Co., Ltd. Including Demonstration
	09:45 – 10:00	Tea Break	
	10:00 - 10:45	Necessity of house-connection and tertiary pipe for sewerage system project incl.QA	Mr. Tamaki Mori (*7)
	10:45 - 11:45	Small type manhole and Plastic material for flood control facility incl.QA	Sekisui Chemical Co., Ltd.
	11:45 - 14:45	Closing ceremony and Farewell party	

*1: Rank of Deputy Direction General, Head of Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction

*2: VSC, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*3: Sewerage and Water Supply Expert, Viet Nam Water, Sanitation and Environment JSC (VIWASE)

*4: Director of CNEE - CUWC

*5: Drainage and Sewerage and Wastewater Treatment Management Division, Administration of Technical Infrastructure (ATI), Ministry of Construction (MOC)

*6: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE – CUWC

*7: JICA Long-term Expert

Source: JICA Consultant Team

6.3 Participants

The participants and their organizations are shown in Table 6.3.

Table 6.3 Participants of the 7th Training Course

Province/ City	Organization	Number
Tra Vinh Prov.	DOC of Tra Vinh Province	1
Vinh Long Prov.	DPI of Vinh Long Province	2
	Vinh Long Province	1
	DOC of Vinh Long Province	1
	Vinh Long CPC	2
Dong Thap Prov.	Dong Thap DOC	2
	Sa Dec CPC	3
	Cao Lanh CPC	2
	Dong Thap Water Supply and Environment JS Company	3
An Giang Prov.	DOC	1
	Long Xuyen CPC	1

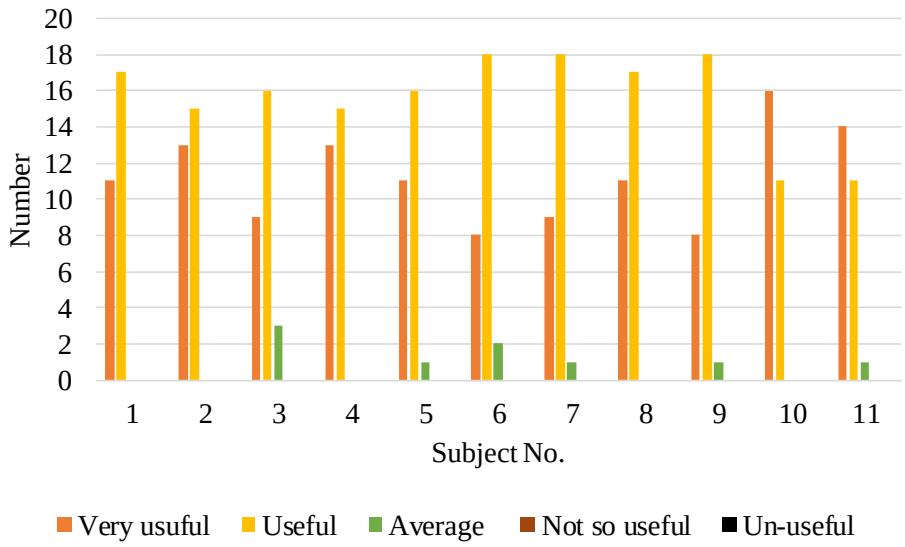
Kien Giang Prov.	Kien Giang DOC	1
	Ha Tien CPC - PMU	1
	Rach Gia CPC	2
	Service Consultancy Center of Rach Gia City	1
Can Tho City	ODA PMU	3
	DOC	3
	Institute of Construction Planning	3
	Can Tho WASCO	4
Hau Giang Prov.	Vi Thanh City	1
	Hau Giang DOC	1
Soc Trang Prov.	Soc Trang DOC	1
	Soc Trang CPC	2
Bac Lieu Prov.	Bac Lieu CPC	1
	Bac Lieu DOC	3
Ca Mau Prov.	DOC	4
Total		**50**

Source: JICA Consultant Team

6.4 Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 6.1. The details are in the training report attached in the electric report data. Most of the answers were “very useful” or “useful”. Especially, the number of “very useful” of No. 10, house connection, was the highest. It seems that the trainees were highly satisfied.



No.	Subject
1	Management and Planning of Sewerage & Drainage – Wastewater Treatment in Viet Nam
2	Structure of Sewerage & Drainage Master Plan
3	Preparation of Master Plan in Nam Dinh
4	Basic Planning of Sewerage Pipe Network
5	Pipe Jacking and Micro Tunneling
6	Pipe Design Program
7	PTF Technology
8	CCTV

9	Database and Mapping for Sewerage and Drainage
10	Necessity of Household Connection and Tertiary Network
11	Small Type Manhole and Plastic Materials for Flood Control Facility

Source: JICA Consultant Team

Figure 6.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized below. There were questions about the problems that the trainees have encountered in their organizations in the questionnaire.

Table 6.4 Request and Comments from the Trainees

Item	Contents
Request	・ Discussion with lecturer and trainees should be taken.
Subject to be added	・ The latest pipeline design method ・ The introduction of Japanese sewerage and drainage project which is applicable to Vietnam ・ Social investigation such as tariff for sewerage development. ・ Effective hydraulic calculation method ・ Investment plan for sewerage development
Problems in the organization	・ The income of sewerage project does not increase because the sewerage coverage ratio is low due to the low house connection ratio and the tariff is too cheap. Eventually, sewerage project cannot fasciate investors. Also, legal system for PPP is not developed. ・ Sewerage tariff is not enough to manage facilities in urban area. ・ Sewerage system is not developed well, moreover O&M system and monitoring system are not developed either. Eventually, the cost for repair becomes high. ・ Lack of fund ・ Lack of STP ・ The awareness of residents for water environment conservation is inadequate. ・ the local government staff do not have the knowledge for water environment conservation. Also, management tool is not settled. ・ The regulation for sewerage system is inadequate. ・ Investigation of current condition of sewage system such as sewer pipelines is not implemented. ・ Appropriate water quality test or sewer treatment method are not selected. ・ Financing or gradual investment for sewerage system have not been done. ・ Separated sewer system is installed. The awareness of residents for importance of sewerage is inadequate, therefore the progress of house connection is not very well. ・ The pollution of water environment has been worse.

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- The lecture of database is supposed to show how to use the actual software, but it cannot be done. It should be prepared for the next training course although it will be the preliminary design course.

7. EIGHTH PILOT TRAINING COURSE (PRELIMINARY DESIGN COURSE)

7.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 7.1.

Table 7.1 The Program of the 8th Training Course

Date	Venue	Target Area	Target Trainee
Mar. 26th ~26th , 2019	CUWC (Hanoi)	North area	Consultant

Source: JICA Consultant Team

7.2 Program of the Training

The program of the 8th training course is shown in Table 7.2.

Table 7.2 Program of the 8th Training Course

Date	Time	Subject	Lecturer
3/26 (Tue)	08:15 - 08:30	Registration, Distribution of documents	CUWC
	08:30 - 09:00	Opening ceremony	
	09:00 - 10:00	Challenge and Solution for Appropriate Sewerage System in Viet Nam – 1	Mr. Pham Thanh Dat (*1)
	10:00 - 10:15	Tea Break	
	10:15 - 11:30	Challenge and Solution for Appropriate Sewerage System in Viet Nam – 2	Mr. Pham Thanh Dat (*1)
	11:30 - 13:30	Lunch	
	13:30 – 14:30	Points to be checked in the design work of sewer – 1	Ms. Vu Thi Hoai An (*2)
	14:30 - 15:00	Tea Break	
	15:00 - 16:00	Points to be checked in the design work of sewer – 2	Ms. Vu Thi Hoai An (*2)
3/27 (Wed)	08:30 – 09:30	Sewer network database system – 1	Mr. Duc, Ms. Phuong (*3)
	09:30 - 09:45	Tea Break	
	09:45 - 10:45	Sewer network database system – 2	Mr. Duc, Ms. Phuong (*3)
	10:45 - 11:55	Pipe design supporting system – 1	Mr. Liem (*3), Mr. Dat
	11:55 - 13:30	Lunch	
	13:30 - 14:30	Pipe design supporting system – 2	Mr. Liem (*3), Mr. Dat
	14:30 - 15:00	Tea Break	
	15:00 - 16:00	Pipe design supporting system – 3	Mr. Liem (*3), Mr. Dat
3/28 (Thu)	09:00 - 10:00	Pipe design supporting system – 4	Mr. Liem (*3), Mr. Dat
	10:00 - 10:20	Tea Break	
	10:20 - 11:30	Pipe design supporting system – 5	Mr. Liem (*3), Mr. Dat
	11:30 - 13:30	Closing ceremony and Farewell party	

*1: Director of CNEE - CUWC

*2: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE – CUWC

*3: CUWC

Source: JICA Consultant Team

7.3 Participants

The participants and their organizations are shown in Table 7.3. Consultants based in Hanoi were recruited for this training course. Three trainees from the Project Management Unit (HWSEPMU), who are now conducting the sewerage project in Hanoi, participated.

Table 7.3 Participants of the 8th Training Course

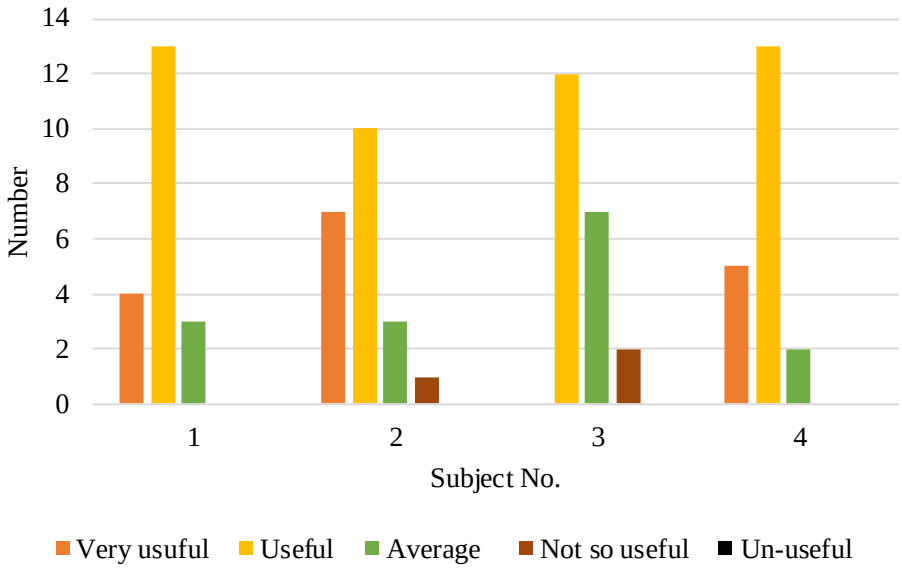
Organization	Number
Sewerage and Water Supply Design Consulting Center - Viet Nam Construction Design and Investment Consultant JSC. (CDC)	3
Oriental Consultant and Construction Investment JSC. (OCI)	5
Viet Nam Water, Sanitation and Environment JSC. (VIWASE)	3
Viet Nam Construction Consultant Corporation (VNCC)	4
Nam Viet Environment JSC.	2
Ha Noi Water Supply, Sewerage & Environment Projects Management Unit (HWSEPMU)	3
Total	**20**

Source: JICA Consultant Team

7.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 7.1. The details are in the training report attached in the electric report data.



No.	Subject
1	Appropriate Sewerage System in Viet Nam
2	Main Points to be Checked in the Design Work of Sewer
3	Sewer Network Database System

4	Sewer Pipeline Design Support Program (PDP)

Source: JICA Consultant Team

Figure 7.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 7.4 Request and Comments from the Trainees

Item	Contents
Request	・ Please focus on the design of sewerage system. ・ Please focus on PDP
Subject to be added	・ The structure of CSO ・ Technical Q&A session about the design of water supply and sewerage pipes. ・ The advantage of sewer pipe network of Japan. ・ Renewal design method of old sewerage system in the densely populated area. ・ Planning of sewerage and drainage system ・ Intensive course of sewer treatment method should be held by VSC.

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- Shipping of GI was done right before the beginning of the training course because it took time to get the signature from ATI, so the recruitment of trainees was difficult. Hence, the GI must be prepared a month before the training course

8. NINTH PILOT TRAINING COURSE (PRELIMINARY DESIGN COURSE)

8.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 8.1.

Table 8.1 Program of the 9th Training Course

Date	Venue	Target Area	Target Trainee
Jul. 17th ~19th, 2019	Guest House T78 (HCMC)	HCMC	Consultant

Source: JICA Consultant Team

8.2 Program of the Training

The program of the 9th training course is shown in Table 8.2.

Table 8.2 Program of the 9th Training Course

Date	Time	Subject	Lecturer
Jul. 17th (Wed)	08:00 - 08:30	Registration, Distribution of documents	CUWC
	08:30 – 08:45	Opening Ceremony	
	08:45 - 9:05	Mechanism of VSC training and MP/FS based on Japanese guideline	JICA Expert
	09:05 - 10:05	Database System for sewer network - 1	Japanese expert
	10:05 - 10:30	Tea Break	

	10:30 – 12:00	Database System for sewer network - 2	Mr. Nguyễn Công Đức (*1)
	12:00 - 14:00	Lunch	
	14:00 – 15:15	Points to be checked in the design work of sewer	Ms. Vu Thi Hoai An (*2)
	15:15 – 15:45	Tea Break	
	15:45 – 16:45	Pipe design supporting system – 1	Mr. Hoang Quoc Liem (*1)
18th (Thu)	08:30 - 9:30	Pipe design supporting system – 2	Mr. Hoang Quoc Liem
	9:30 – 10:00	Tea Break	
	10:00 – 11:30	Pipe design supporting system – 3	Mr. Hoang Quoc Liem
	11:30 – 13:30	Lunch	
	13:30 – 14:30	Pipe design supporting system – 4	Mr. Hoang Quoc Liem
	14:30 – 15:00	Tea Break	
	15:00 – 16:00	Pipe design supporting system – 5	Mr. Hoang Quoc Liem
	16:00 – 16:15	Discussion	Mr. Hoang Quoc Liem
19th (Fri)	8:30 – 9:45	PVC Small type manhole system & flood control	Sekisui Limited.
	9:45 – 10:15	Tea Break	
	10:15 - 11:15	Introduction of Johkasou (Japanese efficient small STP)	Okamura Vietnam
	11:15 - 13:15	Lunch	
	13:15 – 14:15	Challenge & Solution for appropriate sewerage system in Vietnam – 1	Mr. Pham Thanh Dat (*3)
	14:15 – 14:30	Tea Break	
	14:30 – 16:00	Challenge & Solution for appropriate sewerage system in Vietnam – 2	Dr. Do Thuan An (*4)
	16:00 – 17:00	Closing Ceremony	
	17:00 – 19:00	Farewell Party	

*1: CUWC

*2: Standing Vice Head of Urban Technique Faculty cum Vice Director of CNEE – CUWC

*3: Director of CNEE - CUWC

*4: Head of Department of Environmental Engineering, University of Water Resource cum Viet Nam Water, Sanitation and Environment JSC

Source: JICA Consultant Team

8.3 Participants

The participants and their organizations are shown in Table 8.3.

Table 8.3 Participants of the 9th Training Course

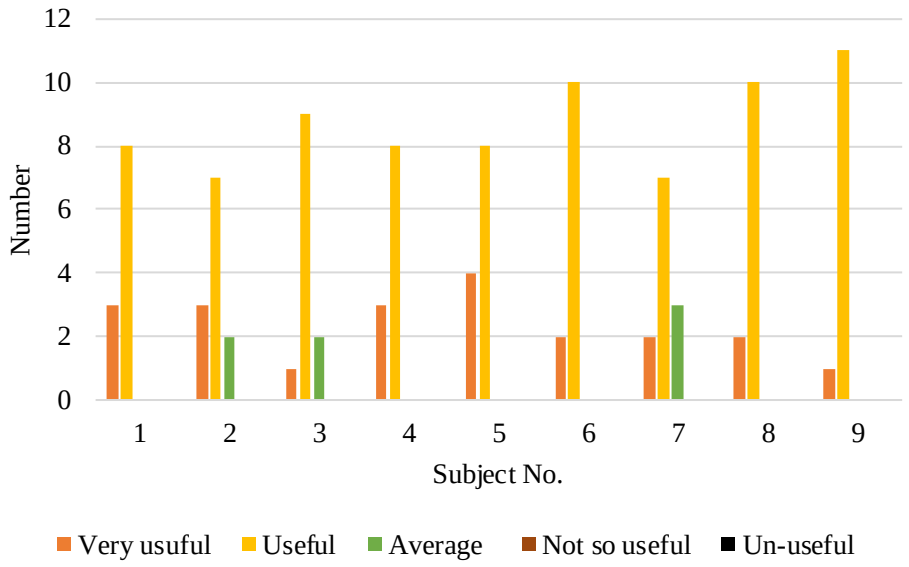
Organization	Number
Cho Chi Minh City Urban Drainage JSC. (UDC)	3
Cuu Long Construction Consulting JSC.	2
Consultant and Inspection JSC of Construction Technology and Equipment (CONINCO) – Hoc Chi Minh Branch	2
Van Hoi Phat FOSUP JSC	2
National of General Construction Consultant JSC (NAGECCO)	1
Ho Chi Minh University of Natural Resources and Environment	6
Ho Chi Minh University of Technology	2
Total	**18**

Source: JICA Consultant Team

8.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 8.1. The details are in the training report attached in the electric report data.



No.	Subject
1	Mechanism of VSC training and MP/FS based on Japanese guideline
2	Database System for sewer network - 1 (By Expert)
3	Database System for sewer network - 2 (by CUWC Lecturer)
4	Points to be checked in the design work of sewer
5	Pipe design supporting system
6	PVC Small type manhole system & flood control
7	Introduction of Johkasou (Japanese efficient small STP)
8	Challenge for Appropriate Sewerage System in Viet Nam
9	Solution for Appropriate Sewerage System in Viet Nam

Source: JICA Consultant Team

Figure 8.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 8.4 Request and Comments from the Trainees

Item	Contents
Request	・ The contents of PDP lecture should be more detailed.
Subject to be added	・ O&M of sewer and drainage network and STP. ・ Water supply ・ Pipe design software

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- The textbook and presentation document of Compus II have been improved compared with the previous ones. However, it must undergo further revisions.

9. TENTH PILOT TRAINING COURSE (PLANNING COURSE)

9.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 9.1.

Table 9.1 Program of the 10th Training Course

Date	Venue	Target Area	Target Trainee
Sept. 22nd ~25th, 2019	Pistachio Hotel (Lao Cai province)	North mountainous area	Local government employee

Source: JICA Consultant Team

9.2 Program of the Training

The program of the 10th training course is shown in Table 9.2.

Table 9.2 Program of the 10th Training Course

Date	Time	Subject	Lecturer
Sept. 22nd (Sun)	15:00 - 17:00	Registration Distribution of documents	CUWC, VSC Team
23rd (Mon)	08:00 - 08:30	Opening ceremony	
	8:30 – 9:15	Mechanism of VSC training & MP based on Japanese guideline and Necessity of house-connection & pipe network for sewerage system project	Mr. Tamaki Mori – JICA long term expert
	09:15 - 09:45	Sharing experiences of carrying out sewerage and drainage work in Lao Cai and Summarizing the implementation of sewerage and drainage projects in Lao Cai	Representative from Lao Cai province
	09:45 - 10:00	*Tea Break*	
	10:00 - 11:30	Structure of sewerage and drainage master plan.	Dr. Do Thuan An - Viwase
	11:30 - 13:30	*Lunch*	
	13:30 – 15:15	Basic planning for sewerage pipe network	Dr. Do Thuan An - Viwase
	15:15 - 15:30	Tea Break	
	15:30 – 16:15	Strengthening sewerage collection capacity through developing system of household connection and tertiary network.	Mr. Pham Thanh Dat - CUWC
	16:15 – 17:00	Introduction of Johkasou (Japanese efficient small STP)	Okamura Vietnam
24th (Tue)	08:00 – 09:00	Introduction of Pipe design assistant system	Pipe Design, Inc – Mr. Hoang Quoc Liem (CUWC)
	09:00 - 10:00	Introduction of Pipe design assistant system	Pipe Design, Inc – Mr. Hoang Quoc Liem (CUWC)
	10:00 - 10:15	*Tea Break*	
	10:15 – 11:00	Introduction of CCTV Camera System	Ms. Vu Thi Hoai An - CUWC
	11:00 – 12:00	Introduction of PTF wastewater treatment	Meta Water Co., Ltd.

Date	Time	Subject	Lecturer
		technology	
	12:00 - 14:00	*Lunch*	
	14:00 - 15:00	Sewerage & drainage database system	Tamano Consultants Co., Ltd. – Mr. Nguyen Cong Duc (CUWC)
	15:00 – 15:45	Dehydrator for sludge and Dryer of sludge	Tsurumi Pump/ KOBELCO Vietnam
	15:45 – 16:00	*Tea Break*	
	16:00 – 17:00	Small type manhole and Plastic material for flood control facility	Sekisui Chemical Co., Ltd.
25th (Wed)	8:00 – 9:00	Move to WWTP in Lao Cai city	
	9:00 – 11:00	Site visit of WWTP in Lao Cai city	
	11:00 – 14:00	Closing ceremony and Farewell party in Lao Cai city	

Source: JICA Consultant Team

9.3 Participants

The participants and their organizations are shown in Table 9.3.

Table 9.3 Participants of the 10th Training Course

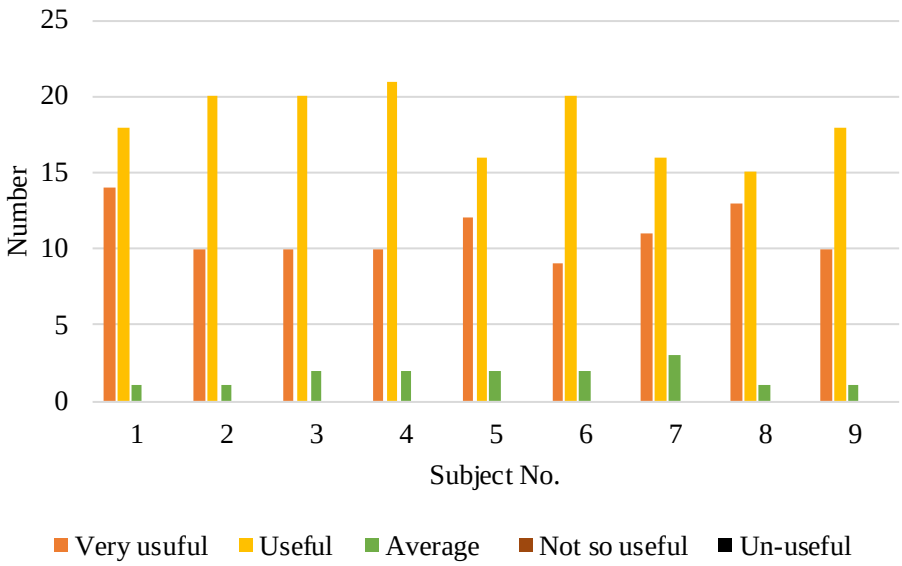
Organization	Number
Bac Giang CPC	1
Urban management division - CPC	3
Office of CPC	1
Cao Bang DOC	4
Bac Kan CPC	2
Planning Division - Bac Kan DOC	4
Architecture, Planning and urban development Division, Thai Nguyen DOC	3
Lao Cai CPC	3
Lao Cai URENCO	3
Urban Development Division - Department of Transportation, Construction	3
Planning and Architecture Institute - DOTC	3
Sapa District PC	1
Ha Giang DOC	1
Phu Tho DOC	4
Lai Chau DOC	3
Son La DOC	2
Total	**41**

Source: JICA Consultant Team

9.4 Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 9.1. The details are in the training report attached in the electric report data.



No.	Subject
1	Structure of sewerage and drainage master plan
2	Strengthening sewerage collection capacity through developing system of household connection and tertiary network.
3	Introduction of Johkasou (Japanese efficient small STP)
4	Introduction of Pipe design assistant system
5	Introduction of CCTV Camera System
6	Introduction of PTF wastewater treatment technology
7	Sewerage & drainage database system
8	Dehydrator for sludge and Dryer of sludge
9	Small type manhole and Plastic material for flood control facility

Source: JICA Consultant Team

Figure 9.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 9.4 Request and Comments from the Trainees

Item	Contents
Request	・ Lecturers must have more technical knowledge. ・ Time for discussion should be taken.
Subject to be added	・ Countermeasure for flood in the low land area. ・ The experienced of planning and construction of sewerage facility and sewer treatment in the urban area and developing countries. ・ Setting method of drainage and sewer area based on the urban type. Management method of drainage and sewer network. ・ New planning method to solve the problems of urban development.

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- Nothing

10. ELEVENTH PILOT TRAINING COURSE (PRELIMINARY DESIGN COURSE)

10.1 Outline of The Training

The schedule, venue and targeted trainees are shown in Table 10.1.

Table 10.1 Program of the 11th Training Course

Date	Venue	Target Area	Target Trainee
Oct. 30th ~Nov. 1st, 2019	Poseidon Hotel (Nha Trang)	Middle southern area	Local government

Source: JICA Consultant Team

10.2 Program of the Training

The program of the 10th training course is shown in

Table 10.2 Program of the 11th Training Course

Date	Time	Contents	Main Lecturers
Oct. 30th (Wed)	08:00 - 08:30	Registration, Distribution of documents	CUWC
	08:30 – 08:35	Opening Ceremony	
	08:35 - 9:00	Mechanism of VSC training and MP/FS based on Japanese guideline and Necessity of household connection & pipe network	JICA Expert
	09:00 - 10:05	Structure of Sewerage and Drainage Master Plan	Dr. Đỗ Thuận An
	10:05 - 10:30	Tea Break	
	10:30 – 12:00	Basic Planning for Sewerage Pipe Network	Dr. Đỗ Thuận An
	12:00 - 13:30	Lunch	
	13:30 – 13:45	Discussion on the content of morning's lectures	Dr. Đỗ Thuận An
	13:45 – 15:00	Strengthening Sewerage Collection Capacity through Developing System of Household Connection and Tertiary Network	Mr. Phạm Thành Đạt
	15:00 – 15:30	Tea Break	
	15:30 – 16:45	Sewerage system and points to be checked in the design & construction work of sewer	Ms. Vũ Thị Hoài Ân
31st (Thu)	08:30 - 9:30	Pipe design supporting system – 1	Mr. Hoàng Quốc Liêm
	9:30 – 10:00	Tea Break	
	10:00 – 11:30	Pipe design supporting system – 2	Mr. Hoàng Quốc Liêm
	11:30 – 13:30	Lunch	
	13:30 – 14:30	Pipe design supporting system– 3	Mr. Hoàng Quốc Liêm
	14:30 – 15:00	Tea Break	
	15:00 – 16:00	Dehydrator & dryer for sludge	Tsurumi Pump / Kobelco
	16:00 – 16:45	Johkasou – Decentralized wastewater treatment equipment	Okamura Vietnam
Nov. 1st (Fri)	8:30 – 9:30	Database System for sewer network - 1	Japanese Expert
	9:30 – 10:30	Database System for sewer network - 2	Mr. Nguyễn Công Đức
	10:30 - 11:00	Tea Break	
	11:00 - 12:00	PVC Small type manhole system & flood control	Sekisui Limited.
	12:00 – 14:00	Lunch	
	14:00-14:30	Sharing experience during sewerage project	Khanh Hoa Development

		implementation in Nha Trang	PMU (KDPM)
	14:30 – 16:30	Site visit of HHC & pipe construction	WB project
	16:30 – 17:00	Closing Ceremony	
	17:00 – 19:00	Farewell party	

Source: JICA Consultant Team

10.3 Participants

The participants and their organizations are shown in Table 10.3.

Table 10.3 Participants of the 11th Training Course

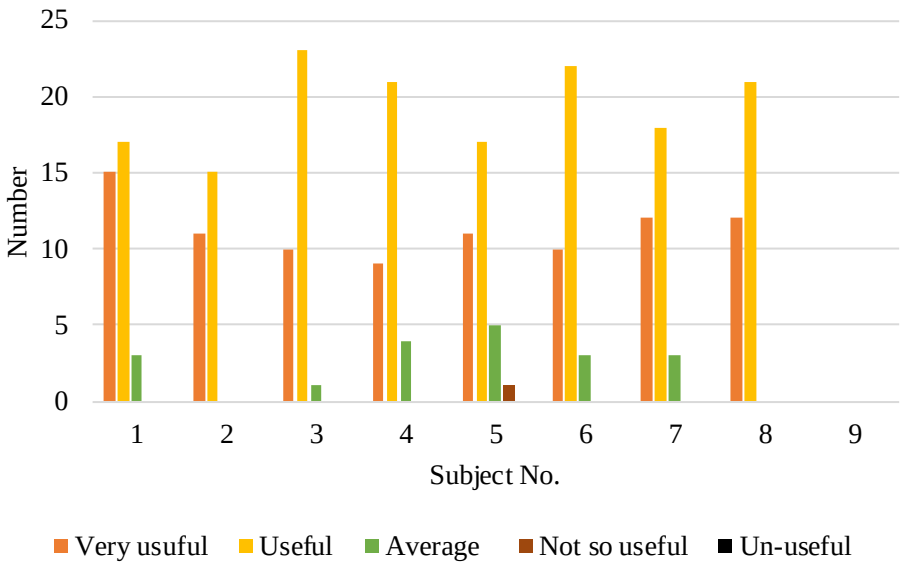
Organization	Number
Ninh Thuan ODA Board of Water Sector Management and Capacity Building	5
Buôn Ma Thuột CPC - Urban Management Division	3
Đăk Lăk URENCO	2
Dak Lak DOC	3
Nha Trang Public Service Management Board Unit	2
Khanh Hoa Development PMU	8
Khanh Hoa Water Supply & Sewerage JS Company	2
Nha Trang CPC	4
Nha Trang URENCO	3
Gia Lai DOC	4
Quy Nhon Public Service Management Board	2
Lam Dong Water Supply & Sewerage JS Company	2
Kontum DOC	4
Total	**45**

Source: JICA Consultant Team

10.4 The Result of Questionnaire and Lessons for the next Training Course

(1) Evaluations by Trainees

The evaluations for each subject are shown in Figure 10.1. The details are in the electric report data.



No.	Subject
1	Structure of Sewerage and Drainage Master Plan & Basic Planning of Sewerage Pipe Network
2	Strengthening sewerage collection capacity through developing system of household connection and tertiary network
3	Sewerage System and Points to be checked in the design & construction works of sewer
4	Pipe Design Program
5	Dehydrator for sludge and dryer of sludge
6	Johkasou – Decentralized wastewater treatment equipment
7	Database and mapping for sewerage and drainage
8	Small type PVC manhole

Source: JICA Consultant Team

Figure 10.1 Evaluations for each Subject

(2) Summary of Answer of Questionnaire for Trainees

The request and comments from the trainees are summarized as below.

Table 10.4 Request and Comments from the Trainees

Item	Contents
Request	・ It is requested to increase the time for each subject and combine with site visit after each subject. ・ More laptops should be equipped so that each trainee can practice the software introduced in the course. ・ It is necessary to supplement more visual equipment and facilities for each subject for better understanding of trainees.
Subject to be added	・ Discussion on difficulties of each provinces for appropriate solutions and actual application ・ Structure of Sewerage and Drainage Master Plan. ・ Water treatment technology in the Vietnam and other countries. ・ Additional introduction of domestic wastewater treatment processes in Japan ・ Some technologies for rehabilitation of damaged sewers

Source: JICA Consultant Team

(3) Recommendations for the Next Training Course

- Nothing

APPENDIX-G

Report of Sewerage Seminar

Ministry of Construction
The Socialist Republic of Vietnam

Japan International Cooperation Agency

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY

OF SEWAGE WORKS

SUMMARY REPORT

SEMINAR

ON

NECESSITY OF SEWERAGE SYSTEM ACCOMPANIED WITH HOUSEHOLD-CONNECTION AND PIPE NETWORK

Hue City
30 July 2019

SUMMARY
OF
SEMINAR
ON
NECESSITY OF SEWERAGE SYSTEM ACCOMPANIED WITH HOUSEHOLD-CONNECTION AND PIPE NETWORK
(30/7/2019 – HUE CITY)

UNDER VSC PROJECT

1. Time and venue

The Seminar was organized for a half day in the Morning of 30 July 2019;

In the Meeting Room of Duy Tan I Hotel, 12 Hung Vuong Street, Hue City.

2. Purpose

The Seminar was organized under scope of VSC Project in cooperation between JICA and MOC (ATI) with following purposes:

- ✓ To share the current situation including legal system for household-connection and challenges for appropriate sewerage system from Implementation Agencies
- ✓ To understand detailed structure of separate & combined sewerage pipe system
- ✓ To introduce Japanese experience on household-connection works
- ✓ To introduce Japanese new technologies as one of the solutions for house-connection matter

3. Participants

The Seminar were attended by 29 people from:

- JICA Viet Nam
- JICA VSC
- ATI (MOC)
- Thua Thien Hue PPC
- Hue CPC
- Hue HEPCO
- Hue PMU
- HCMC DOC
- Lam Dong Water Company (LAWACO)
- Quang Binh URENCO
- CUWC
- SEKISUI Co.

(List of participants is appended by the next).

4. Contents

The Seminar was opened with speeches by respective JICA Viet Nam Office Deputy Chief Representative, Mr. Kitamura Shu and Hue PPC's Vice Chairman, Mr. Phan Thien Dinh;

And attracted nine (9) presentations by nine (9) representatives from participating organizations & various discussion comments under chair by Mr. Tran Anh Tuan, Vice Director General of ATI (MOC).

Generally, presentations and discussion focused on the following contents:

- Legal framework of household-connection
- Current situation of Hue City Environment Improvement Project and Household-connection in Hue City
- Household-connection in Separate Sewerage System in Da Lat
- Household-connection in Combined Sewerage System, Separate Sewerage System and Semi-Sewer System in HCMC
- Current situation & necessity for appropriate sewerage system and detailed structure of separate & combined sewerage pipe system with Japanese experiences
- Sharing gained knowledge and experience of Japanese procedures of all related household-connection works via the training course in Japan under VSC Project
- Introduction of Japanese new technology appropriate for household-connection.
- And finally, general discussions on existing situation of sewerage & drainage and wastewater treatment and some recommendations, including:

  + Contents of legal regulations need to be in detailed and applicable to different conditions of municipalities;

  + MPs to be more practical with longer-term planning and vision;

  + Household-connection procedure and its actual situation (mainly due to limitation of financial fund and people's awareness & custom);

  + Applicatioin of CSS/SSS in the old/new urbans; maintenance and/or disuse of septic tanks (to be considered in relation to applicatiton of CSS or SSS);

  + Central/de-central wastewater treatment;

  + Management and investment responsibility in regard of in-door sewerage & drainage system and out-door sewer system;

  + Financial fund; etc.

Note of some comments/discussions

General sharing from Representative of ATI/MOC

Legal policy and regulations

The existing legal documents applicable to sewerage/drainage and wastewater treatment sector include Law on Construction 2014, Law on Urban Planning and Law on Environmental Protection. Decree No.80/2014/NĐ-CP is the highest practical legal regulation on sewerage/drainage in Viet Nam. Besides, there are lower related legal documents, including Decision 589 on Orientation Plan of sewerage and wastewater, Circulars on construction investment, construction prices, wastewater treatment, wastewater treatment services.

Existing condition and difficulties in implementation

There are total 46 WWTPs for the time being in Viet Nam, with total capacity of 1,980,000 m3/day & night. Treated wastewater ratio reaches 13%. The remaining is being discharged directly to the environment, worsening pollution situation. Hopefully, with the existing number of WWTPs under full operation, treated wastewater ratio will reach 15-20% of urban wastewater which is also the target raised by Government PM.

Difficulties to implementation

Local government leaders take responsibility for making plan for investment of sewerage system-WWTP; however, it requires big investment cost.

Construction work consists of sewer system and WWTPs, of which challenge belongs to construction of sewer system which needs longer time and requires excavation scattering in City.

Indoor sewerage/drainage system is understood as the only one pipe in case of CSS and separate pipes of sewerage and drainage in case of SSS. Household connection to public system is long-term challenge.

Public sewer system (primary, secondary and tertiary) is invested by various sources of funds, local and external, assistance or policy.

Household connection is within landowner's premise and belongs to responsibility of the resident. People do not want to excavate their house floor, or many do not have money for such work.

Household connection is implemented as accompanied with development of sewerage system. Urban development is going on in long term, thus, household connection is also long and continuous work. This matter relates financial fund allocated for HHC, which should be ensured available for long term.

Success of project is partly decided by availability of fund for household connection (fund may be included in project cost or provided by Government, social insurance, etc). It is found that many WWTPs are constructed without influent wastewater or not operated with full design capacity due to influent less than designed.

Difficulties in profiling legal documents:

Decree 80/2014-ND/CP consists of 7 chapters with 49 articles, of which Chapter 4 (6 articles; 30-35) is exclusively for Household connection. Chapter 4 only mentions core issues, not covering overall

matter. In this Seminar, we wish to hear participants' comments sharing experiences from local government leaders, enterprises and external experts for future completion of legal regulations.

Article 30: Connection to sewerage system
Article 31. Requirements for connection to sewerage system
Article 32. Regulations on wastewater discharge at the connection points
Article 33. Regulations on connection
Article 34. Support for connection to public system
Article 35. Connection agreement and exemption

Of which, the most challenged is "Support for connection"; This activity is under responsibility of the Government to consider how to support, what to support. Firstly, it is necessary to raise awareness of people about household connection to help them understand environment protection of everyone not only management agencies. This is pre-condition for smooth implementation. Awareness establishment is the first step to go before fund supporting.

Another obstacle to communication activity is as of limited thinking of people. As local custom, breaking of existing house floor is a taboo. However, if awareness building is satisfactory, people may change their mind and feel willing to do.

Support for connection is understood as not only support of money but also mentality. This responsibility is very important and can be implemented in coordination with local associations (women's association, socio-political associations, etc.).

Connection engineering: compliance of technical standards is certainly required. Household connection is to follow technical requirements before discharging into public system, ensuring maximum restriction of leakage and infiltration which may cause change to influent quality and quantity.

Experience in implementation of household connection (steps of work, points to be considered, implementation institution, etc.)

As planning project, future urban development should be reviewed, accordingly, waiting point for household connection is to be fixed.

Connection requirement: In urban area, corridor area and public land is under government's management, where public sewer system is construction. The Government is to make investment of works on public land (primary, secondary and tertiary sewers), works in premise of private land are invested by properties' owners; Connection box is included in household connection.
Household connection scope of work is including connection box and connection pipe from connection box to indoor structure.

Indoor system shall follow existing technical requirements, separating sewerage and drainage pipes; Local governments are advised to manage and control "Regulations and agreement of household connection" via issue of construction license for new construction work as indispensable condition.

Regulation on discharging point: household domestic wastewater is discharged to connection box; wastewater from service sector, such as, restaurants, hotels, vehicle repairing store, etc. should be primarily treated before discharging into public system. For example, grease separator chamber should be installed in vehicle repairing store.

Regulation on connection: general technical requirements (ground level, planning, flooding prevention, …) to be considered.

Connection time: after completion of public system and WWTP ready to operate.

Financial liability for connection work: residents is responsible to pay for indoor connection (to connection box) and pay for wastewater tariff.

As specified in Decree 80, PPCs take responsibility for issuance of regulations on sewerage, wastewater treatment, system operation.

Attraction of investment fund: It is really a concern for sewerage management agencies in case financial independence is raised for application. As revenue from the existing sewerage activities is just enough for system operation, investment cost should be funded by the Government. BOT project for sewerage and WWTP sector therefore has not been invested because of without creating profit.

Connection support: is an amount used to ensure thorough collection of domestic wastewaters and WWTP operated with full design capacity. Targets of support are state-policy beneficiary households, poor households. This activity is a difficulty however needs considering during urban development.

Support method: by local budget or other fund sources, partially or fully support.

Points to be considered: Community activities to raise people's understanding of the importance of household connection.

Agreement on exemption of household connection: technical requirement, connection point, etc. to be considered to reach agreement on exemption of household connection. Connection point will be identified upon to issuance of construction license. Exemption of household connection is applied in case of the area without public sewers.

Cases of exemption:
+ Discharging source close to WWTP and local primarily treated: may be exempted.
+ New urban area not included in the previous planning;

In general Planning, two types of wastewater treatment are identified, including: on-site treatment and off-site treatment. On-site treatment shall be applicable to new urban area; the local treated wastewater then shall be discharged to drainage system. This new residential area is located between old existing areas to provide accommodation for increasing population. The existing sewer system cannot serve increasing capacity. Wastewater is therefore de-centrally treated before discharging to drainage system.

In approval of detailed planning 1/100 of urban area, it is specified that if public sewer system is not available for receiving connection from the urban area, then small-scale decentralized treatment may be applied.

Strategic directions:
By 2020: ratio of urban sewerage coverage will reach 70%; of which 15-20% to be treated.
By 2025: ratio of urban sewerage coverage will reach 80%; of which 25-30% to be treated.
By 2050: targeting to sustainable sewerage & drainage; 100% of wastewater to be treated.

Some comments from localities:

Sewerage & drainage planning is now a challenge to the Government/MOC. Planning is changed/adjusted every short term.

Planning with short-term vision: existing planning is usually for period of 5-10 years which is too short. If so, household connection cannot be completed even after 100 years.

Planning content is not practical with poor implementation management. Planning and actual are completely different.

For example, in the old planning, a road is local road of a factory which becomes urban road in the new planning.

Connection work: the existing sewer system is CSS; each local household is connected to public sewer via only one indoor pipe. As raining, the City is flooded with actual flow exceeding design capacity of sewer and WWTP; wastewater without being treated is directly discharged to river.

It is recommended that Planning work should be regulated by the Central Government, with term of 30-50 years. Planning should not be made for short term and short vision.

For example, in an existing residential area, it is roughly estimated that 30% of households is connected to SSS and other 70% connected to CSS. However, in the Planning, it should be specified that the ratio of service (SSS-CSS) to be 70%-30% in ten years; and 90-100% connected to SSS in 30 years.

HCMC should learn from Yosaka City of Japan. For example, for similar catchment areas, a WWTP with capacity of 100,000m3/day & night is designed/constructed in Viet Nam, while it is WWTP of 300,000m3/day & night in Japan. In Japan, sewer is designed with big diameter in consideration of increasing flow in the future while in Viet Nam, it is calculated just enough for existing demand. This a challenge to Planning work.

Design calculation:
Urban sewerage system is not consistent which is an outstanding matter in construction investment management.
Geological calculation should be appropriate: in HCMC, SSS is applicable in some areas, however, material of concrete pipe is used which has been settled in areas with low ground level and tiding increased, etc. investment is therefore not efficient.

Policy:
Establishment of sewerage and wastewater treatment tariff: Sewerage tariff frame has not been built in HCMC. Da Lat City is small which is easier for calculation. HCMC is too large with many catchment areas. Each catchment applies a different tariff, while HCMC is divided into 30 catchments with 30 different tariffs. In some cases, two catchments are separated by a road but applying two different sewerage tariffs, which is very difficult and complicated to put into application.

Calculation method as currently specified is not so appropriate with big urbans. HCMC faces many difficulties in processing household connection work, even less advantageous than Hue City.

Some comments about septic tanks

Why septic tanks should not be disused but should be maintained in old urbans?

CSS: In many areas, the existing sewerage system is still CSS with flat bottom manhole without invert ditch. CSS is connected to curb inlets to collect surface water and wastewater from septic tanks.

SSS: is usually applied in new urban areas; sewerage and drainage sewer pipes are separated; sewerage pipe is as tight as water supply system, with invert ditch manholes.

If septic tanks are disused in old urbans, overall night soil will be directly discharged into CSS, causing odor pollution as well as widespread congestion.

Some opinions suppose that septic tanks should be disused to increase pollutant concentration of influent wastewater to WWTP, however, in my personal point of view, treatment process should only be selected after investigation and detailed calculation, etc. identifying pollutant concentrations in influent wastewater, etc. and in consideration of existing sewer system being CSS or SSS.

In Viet Nam, septic tanks are not periodically cleaned but only when stock happens, or house is restored. People do not want to clean septic tanks periodically, since in many cases, it requires floor breaking, etc. This matter belongs to customs and habit which also needs educating.

In some localities in Viet Nam (such as in Ben Tre City), septic tanks of households are periodically cleaned with financial support by local government.

Opinions shared to deal with septic tank matter:

- ✓ Septic tanks should be maintained in the areas with CSS. In new urbans, SSS is applicable without septic tanks.
- ✓ It is recommended that in circumstance of Viet Nam, CSS should be considered for construction in accompanied with WWTP and septic tank sludge treatment plant. HCMC has applied this model. HCMC is large; only two ST sludge treatment plants are not enough. HCMC is now considering making investment for more septic tank sludge treatment plants and conveying pipes to restrict waste sludge tank trucks running through the City. For example, Thanh Luong Ben Cat STP has been additionally invested with septic tank sludge receiving and treatment facilities.
- ✓ CAS should be applied. As in Viet Nam, wastewater contents are unbalanced which is not convenient for efficient treatment. If having better financial condition, sludge dewatering facilities should be invested.

Appendix 1. Agenda

Time	Content	Presenter
8:00- 8:30	Registration	CUWC/JET and ATI
8:30- 8:35	Introduction of Participants	
8:35- 8:50	Opening Remarks:	- Leader of ATI- MOC - JICA Vietnam office (Chief/deputy chief Representative) - Chairman/vice chairman of Thua Thien Hue PPC or Hue CPC
8:50-9:10	Explanation of legal framework of household-connection	ATI - MOC
9:10- 9:30	Current situation of Hue City Water Environm ent Improvement Project and household-connection	Thua Thien Hue
9:30 –9:45	Good practice on household connection in SS	Da Lat
9:45 – 10:00	Good practice on household-connection in CSS SSS and semi-sewer system	HCMC Infrastructure Management Cent re – DOC
10:00 – 10:15	Good practice on household connection in CSS	URENCO Quảng Bình
10:15 -10:30	Tea Break	
10:30- 10:50	Explanation of current situation & necessity for appropriate sewerage system and detailed structure of separate & combined sewerage pipe system	JICA expert
10:50- 11:10	Sharing gained knowledge and experience of Japanese procedures of all related house hold-connection works via the training course in Japan	Representative of CUWC
11:10- 11:30	Introduction of Japanese new technologies	SEKISUI Vietnam
11:30 - 12:00	Discussion & Way forward	
12:00 - 12:15	Closing Remark	ATI
12:15- 13:45	Lunch Time	

Appendix 2. List of participants

No.	Full name	Position	Remark
JICA			
1	KITAMURA Shu	Senior Representative of JICA VN	
2.	ANZO Hiroshi	Senior Project formulation advisor	
3.	KANTO Yuko	Project formulation advisor	
4	Nguyễn Vũ TIỆP	Program officer	
5	Trần Thị Hương GIANG	Program officer	
6	MORI Tamaki	JICA Expert	
7	Đỗ Thị NGA	National project coordinator- JICA VSC	
8	Đỗ Thanh VÂN	VSC Team	
9	Chu Diệu HÀ	VSC Team	
ATI – MOC			
10	Trần Anh TUẤN	Vice Director General of ATI	Chair and MC
HUE CPC			
11	Châu Văn LỘC	Vice chairman	
12	Lê Tuấn VĨNH	Head of Infrastructure management Division	
13	Trần Viết TRUNG	Officer	
14	Nguyễn Mạnh TUẤN	Officer	
HUE PPC			
15	Phan Thiên ĐỊNH	Vice Chairman	
16	Ngô Đắc BỬU	Officer	
HUE HEPCO			
17	Đinh Công KHÁNH	Director	
18	Hùng Hữu DANH	Officer	
HUE PMU			
19	Nguyễn Thanh TUẤN ANH	Director of PMU	
20	Nguyễn Hoài Sơn	Officer	
HCMC Infrastructure Management Centre – HCMC DOC			

21	Lưu Văn TẤN	Deputy Director	
Lam Dong Water company (LAWACO)			
22	Huỳnh Công KHÁNH	Director of Da lat STP, vice director of LAWACO	
Quang Binh URENCO			
23	Phạm Đức THÁI	Chairman of board of Dong Hoi URENCO	
24	Nguyễn Quang Hòa	Head of O&M Division	
CUWC			
25	Bùi Hồng HUẾ	Rector	
26	Vũ Thị HOÀI ÂN	Dean of Technical infrastructure division	
SEKISUI Co., Ltd			
27	Mr.Naka	Representative of Hanoi office	
28	Chế Quốc BẢO	Staff	
29	Mr.THANH	Staff	

Appendix 3. Photos of Activities in the Seminar

Opening of Seminar

Opening Speech by Mr. Kitamura Shu (JICA VN)

Opening Speech by Mr. Vice Chairman of Hue PPC

Presentation by Representative of ATI

Presentation by Representative of Hue HEPCO

Presentation by Representative of LAWACO

Presentation by Representative of HCMC DOC 	Presentation by Representative of Quang Binh URENCO 
Presentation by JICA Expert 	Presentation by Representative of CUWC 
Presentation by Representative of Sekisui Co. 	Discussion in Seminar (1) 

Discussion in Seminar (2) 	Discussion in Seminar (3) 
Discussion in Seminar (4) 	Discussion in Seminar (5) 
Discussion in Seminar (6) 	Discussion in Seminar (7) 

Photo of Seminar Overview

All participants on Seminar Closing Ceremony

Ministry of Construction
The Socialist Republic of Vietnam

Japan International Cooperation Agency

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY

OF SEWAGE WORKS

SUMMARY REPORT

SEMINAR

ON

NECESSITY OF SEWERAGE SYSTEM ACCOMPANIED WITH HOUSEHOLD-CONNECTION AND PIPE NETWORK

Hanoi, 13 November 2019

SUMMARY REPORT
OF
SEMINAR
ON
NECESSITY OF SEWERAGE SYSTEM ACCOMPANIED WITH HOUSEHOLD-CONNECTION AND PIPE NETWORK
(13/11/2019 – HANOI)

UNDER VSC PROJECT

1. Time and venue

The Seminar was organized for a half day in the Morning of 13 November 2019;

In the Meeting Room of Melia Hotel, 44 Ly Thuong Kiet, Hoan Kiem, Hanoi.

2. Purpose

The Seminar was organized under scope of VSC Project in cooperation between JICA and MOC (ATI) with following purposes:

- ✓ To share the current situation including legal system for household-connection and challenges for appropriate sewerage system from Implementation Agencies
- ✓ To understand detailed structure of separate & combined sewerage pipe system
- ✓ To introduce Japanese experience on household-connection works
- ✓ To introduce Japanese new technologies as one of the solutions for house-connection matter

3. Participants

The Seminar were attended by 62 people from:

1) JICA Headquarter
2) JICA Viet Nam
3) JICA VSC
4) ATI (MOC)
5) Binh Duong PMU
6) Buon Ma Thuot PMU
7) Hanoi DOC
8) Maintenance Board for technical infrastructure works - Hanoi DOC
9) Hanoi Sewerage and Drainage Company (HSDC)
10) Hanoi Construction, Investment on water supply, drainage, sewerage and environment PMU
11) Ha Long PMU
12) Hai Phong PMU
13) Hung Yen CPC
14) Hung Yen DOC
15) Thai Binh DOC

16) Phu Ly CPC – Ha Nam province
17) Hoa Binh DOC
18) Phu Tho DOC
19) Bac Giang CPC
20) Hanoi University of Architecture
21) Institute on Science, Technique and Environment
22) Representative from ADB
23) Representative from GIZ
24) CUWC
25) SEKISUI Co.

(List of participants is appended by the next).

4. Contents

The Seminar was opened with speeches by DG. Mai Thi Lien Huong, Director General of ATI (MOC) and Mr. Kitamura Shu, Deputy Chief Representative of JICA Viet Nam Office.

And attracted eight (8) presentations by eight (8) representatives from participating organizations & various discussion comments under chair by DG. Mai Thi Lien Huong, Director General of ATI (MOC).

Generally, presentations and discussion focused on the following contents:

- Legal framework of household-connection
- Sharing experience on household connection works in Binh Duong Province
- Sharing experience on household connection implementation works in Buon Ma Thuot. Difficulties and challenges during project implementation
- Direction and Plan of necessity of household connection and pipe collection system from the viewpoint of Donor
- Study on improvement of legal framework in sewerage works
- Explanation of current situation & necessity for appropriate sewerage system and introduce Japanese experience on household connection and pipe network
- Sharing gained knowledge and experience of Japanese procedures of all related household-connection works via the training course in Japan
- Introduction of Japanese technology for household connection

And finally, general discussions on existing situation of sewerage & drainage and wastewater treatment and some recommendations, including:

- House connection, Plumber, Connection-Hole
- Septic-tank, remaining or demolish, floor broken

- STP problem with inflow of low quantity and diluted
- Interceptor, Separated or Combined Sewerage System
- New pipe laying with connection hole, Manhole with Invert
- Grand map with flow calculation
- Data-base system & house-connection
- Decree 80, Province ordinance
- Master Plan, Feasibility Study

Note of some comments/discussions

General sharing from Representative of ATI/MOC

Legal policy and regulations

The existing legal documents applicable to sewerage/drainage and wastewater treatment sector include Law on Construction 2014, Law on Urban Planning and Law on Environmental Protection. Decree No.80/2014/NĐ-CP is the highest practical legal regulation on sewerage/drainage in Viet Nam. Besides, there are lower related legal documents, including Decision 589 on Orientation Plan of sewerage and wastewater, Circulars on construction investment, construction prices, wastewater treatment, wastewater treatment services.

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There are total 46 WWTPs for the time being in Viet Nam, with total capacity of 1,980,000 m3/day & night. Treated wastewater ratio reaches 13%. The remaining is being discharged directly to the environment, worsening pollution situation. Hopefully, with the existing number of WWTPs under full operation, treated wastewater ratio will reach 15-20% of urban wastewater which is also the target raised by Government PM.

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Local government leaders take responsibility for making plan for investment of sewerage system-WWTP; however, it requires big investment cost.

Construction work consists of sewer system and WWTPs, of which challenge belongs to construction of sewer system which needs longer time and requires excavation scattering in City.

Indoor sewerage/drainage system is understood as the only one pipe in case of CSS and separate pipes of sewerage and drainage in case of SSS. Household connection to public system is long-term challenge.

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Household connection is implemented as accompanied with development of sewerage system. Urban development is going on in long term, thus, household connection is also long and continuous work. This matter relates financial fund allocated for HHC, which should be ensured available for long term.

Success of project is partly decided by availability of fund for household connection (fund may be included in project cost or provided by Government, social insurance, etc). It is found that many WWTPs are constructed without influent wastewater or not operated with full design capacity due to influent less than designed.

Difficulties in profiling legal documents:
Decree 80/2014-ND/CP consists of 7 chapters with 49 articles, of which Chapter 4 (6 articles; 30-35) is exclusively for Household connection. Chapter 4 only mentions core issues, not covering overall matter. In this Seminar, we wish to hear participants' comments sharing experiences from local government leaders, enterprises and external experts for future completion of legal regulations.

Article 30: Connection to sewerage system
Article 31. Requirements for connection to sewerage system
Article 32. Regulations on wastewater discharge at the connection points
Article 33. Regulations on connection
Article 34. Support for connection to public system
Article 35. Connection agreement and exemption

Of which, the most challenged is "Support for connection"; This activity is under responsibility of the Government to consider how to support, what to support. Firstly, it is necessary to raise awareness of people about household connection to help them understand environment protection of everyone not only management agencies. This is pre-condition for smooth implementation. Awareness establishment is the first step to go before fund supporting.

Another obstacle to communication activity is as of limited thinking of people. As local custom, breaking of existing house floor is a taboo. However, if awareness building is satisfactory, people may change their mind and feel willing to do.

Support for connection is understood as not only support of money but also mentality. This responsibility is very important and can be implemented in coordination with local associations (women's association, socio-political associations, etc.).

Connection engineering: compliance of technical standards is certainly required. Household connection is to follow technical requirements before discharging into public system, ensuring maximum restriction of leakage and infiltration which may cause change to influent quality and quantity.

Experience in implementation of household connection (steps of work, points to be considered, implementation institution, etc.)

As planning project, future urban development should be reviewed, accordingly, waiting point for household connection is to be fixed.

Connection requirement: In urban area, corridor area and public land is under government's management, where public sewer system is construction. The Government is to make investment of works on public land (primary, secondary and tertiary sewers), works in premise of private land are invested by properties' owners; Connection box is included in household connection.
Household connection scope of work is including connection box and connection pipe from connection box to indoor structure.

Indoor system shall follow existing technical requirements, separating sewerage and drainage pipes; Local governments are advised to manage and control "Regulations and agreement of household connection" via issue of construction license for new construction work as indispensable condition.

Regulation on discharging point: household domestic wastewater is discharged to connection box; wastewater from service sector, such as, restaurants, hotels, vehicle repairing store, etc. should be primarily treated before discharging into public system. For example, grease separator chamber should be installed in vehicle repairing store.

Regulation on connection: general technical requirements (ground level, planning, flooding prevention, …) to be considered.

Connection time: after completion of public system and WWTP ready to operate.

Financial liability for connection work: residents is responsible to pay for indoor connection (to connection box) and pay for wastewater tariff.

As specified in Decree 80, PPCs take responsibility for issuance of regulations on sewerage, wastewater treatment, system operation.

Attraction of investment fund: It is really a concern for sewerage management agencies in case financial independence is raised for application. As revenue from the existing sewerage activities is just enough for system operation, investment cost should be funded by the Government. BOT project for sewerage and WWTP sector therefore has not been invested because of without creating profit.

Connection support: is an amount used to ensure thorough collection of domestic wastewaters and WWTP operated with full design capacity. Targets of support are state-policy beneficiary households, poor households. This activity is a difficulty however needs considering during urban development.

Support method: by local budget or other fund sources, partially or fully support.

Points to be considered: Community activities to raise people's understanding of the importance of household connection.

Agreement on exemption of household connection: technical requirement, connection point, etc. to be considered to reach agreement on exemption of household connection. Connection point will be identified upon to issuance of construction license. Exemption of household connection is applied in case of the area without public sewers.

Cases of exemption:
+ Discharging source close to WWTP and local primarily treated: may be exempted.
+ New urban area not included in the previous planning;

In general Planning, two types of wastewater treatment are identified, including: on-site treatment and off-site treatment. On-site treatment shall be applicable to new urban area; the local treated wastewater then shall be discharged to drainage system. This new residential area is located between old existing areas to provide accommodation for increasing population. The existing sewer system cannot serve increasing capacity. Wastewater is therefore de-centrally treated before discharging to drainage system.

In approval of detailed planning 1/100 of urban area, it is specified that if public sewer system is not available for receiving connection from the urban area, then small-scale decentralized treatment may be applied.

Strategic directions:
By 2020: ratio of urban sewerage coverage will reach 70%; of which 15-20% to be treated.
By 2025: ratio of urban sewerage coverage will reach 80%; of which 25-30% to be treated.
By 2050: targeting to sustainable sewerage & drainage; 100% of wastewater to be treated.

Some questions/comments from provinces/cities:

1. Question from Hoa Binh DOC:

- During project implementation, it is found that there are some problems in the regulations on urban water supply and drainage and sewerage, even in the Decree 80. It is requested ATI (MOC) to build the Law on urban water supply and Law on drainage and sewerage separately for comprehensively applying.

- After completing the project on drainage and sewerage funded by ODA fund, Hoa Binh city is facing in determining the agency for handing over and operating, managing the facilities. It is expected to receive the instructions from ATI and experience sharing from other cities.

a) Response from Vice Director General of ATI - MOC:

- At present, the regulations on water supply and sewerage management are interfered among ministries and departments. The Decree 80 has been implemented for 5 years and it is time for adjusting for appreciate applying. ATI is now updating and adjusting the Decree 80. Moreover, Law on water supply and Law on drainage and sewerage are being built to submit the Assembly for approval, including reference of experiences on implementing in Japan with advice of JICA expert in MOC.

- The guidelines on handing over and receiving the facilities after completing are regulated in Decree 80, in which indicating the possession of facilities belongs to PPC or other decentralized levels.

b) Response from Binh Duong province

- As experience of Binh Duong, after completing project, the facility is handed over PPC. PPC assigns to DONRE to sign the outsource contract with Biwase for operation and maintenance with reason that DONRE is agency to accept the input and output volume as well as to be in charge of online monitoring at STP 24/24 hour. Moreover, as the orientation for the future, PPC will establish a PMU on water sector, under PPC to manage the water section facilities and consult to PPC the projects on drainage and sewerage, sign the outsource contract or bidding contract for operation and management of drainage, sewerage system.

c) Response from Buon Ma Thuot PMU

- Buon Ma Thuot CPC is the owner of drainage and sewerage facilities. Therefore, CPC will sign the outsource contract with agency for operation and maintenance work for sewerage facilities.

2. Question from JICA Vietnam Office

- After having funded ODA by the donor for constructing the WWTP, the industrial processing zones will be owner of that facility. However, prior to signing the outsource contract or bidding for operation and maintenance, the owner must equip the legal base to build the unit price for contracting. What is the financial and technical bases for giving the unit price for effective outsource contract and bidding?

a) Response from Binh Duong province

- Binh Duong province has only applied annual outsource contract for operation and maintenance, it has been applied the bidding. However, after handing over and putting into use, it spends 6 months for trial operation. During that period, the owner has sufficient time and experience for determining the norm and building the unit price for operation and maintenance outsource and bidding contract.

- Additionally, the later facilities with similar treatment technology can be applied the unit price from the operating facility, then, it might be adjusted based on financial source of each owner for suitability.

b) Response from Buon Ma Thuot PMU

- *On the* experience on WWTP operation, before and after being handed over from the Contractor, the operators have been trained on operation work by the contractor. Therefore, the operation of WWTP is convinient.

3. Comments of Institute on Science, Technique and Environment

- This seminar is very important and useful. It takes 25 years to have this seminar on household connection issue since the first project on drainage and sewerage in Vietnam in 1995. It is highly appropriated that JICA goes ahead to study and organize this seminar to improve the understanding on household connection in the construction of drainage, sewerage and wastewater treatment. Lack of household connection is one of the main reason leading to ineffective operation of WWTP despite the costly construction investment. Therefore, it is recommended that household connection requirement shall be obligatory regulations in construction of WWTP or shall be condition for investment fund loan with the message "without connection, there is no investment loan".

- Local governments should issue regulations of household connection based on the local conditions, especially applying to the new construction or improvement houses, regulation on household connection must be one of condition for issuing the construction permission.

- It is encouraged to apply the household connection in front of the house. However, in suburban areas with toilet behind the house, it should be studied the solution of HH connection behind the house, it is named "simplified sewerage system". This solution has advantages of the simple construction method, excavation and economical material due to locating behind the house, avoiding house floor excavation, floor reinstatement and saving cost (only 20%). However, this solution requires the good PR and negotiation activities with the residents t install the sewers through the private land of residents.

- At present, septic tank is property of the residents and they design by themselves. In areas to continue using septic tank, they must be standardized by regulations. In addition, MOC and local governments should build the roadmap for septic tank demolishment, no longer use it in the future.

- Solution for sludge treatment from septic tank should be paid attention because the WWTP only designed for treating wastewater from toilet. Therefore, the sludge should be transported to sludge treatment plan for suitability.

Appendix 1. Agenda

Time	Content	Presenter
8:00- 8:30	Registration	CUWC/JET and ATI
8:30- 8:35	Introduction of Participants	
8:35- 8:50	Opening Remarks:	- Leader of ATI- MOC - JICA Vietnam office (Deputy chief Representative)
8:50-9:10	Explanation of legal framework of household-connection	ATI - MOC
9:10- 9:30	Sharing experience on Household Connection works in Binh Duong province	Binh Duong Province
9:30 –9:50	Sharing experience in Household Connection implementation works in Buon Ma Thuot. Difficulties and challenges during project implementation	Buôn Ma Thuot PMU
9:50 - 10:10	Direction & Plan of Necessity of house-hold connection & pipe collection system from the viewpoint of Donor	Representative of ADB
10:10 -10:40	Tea Break	
10:40- 10:55	Study on improvement of legal framework in sewerage works.	JICA Expert of MOC Policy Advisor
10:55- 11:10	Explanation of current situation & necessity for appropriate sewerage system and •introduce Japanese experience on household-connection & pipe network	JICA Expert of VSC Project
11:10 - 11:25	Sharing gained knowledge and experience of Japanese procedures of all related household-connection works via the training course in Japan	Representative of CUWC
11:25 - 11:40	Introduction of Japanese technology for HHC	SEKISUI
11:40 - 12:10	Discussion & Way forward	ATI
12:10 - 12:15	Closing Remark	ATI

Appendix 2. List of participants

Organization	*Full name*	*Position*
JICA Headquarter	Ms. Shimodaira Chie	Acting Director, Environment Management Team 2, Global Environment Department
JICA Vietnam Office	Mr. Kitamura Shu	Deputy Senior Representative
	Ms. Kanto Yuko	Project Formulation Advisor
	Mr. Ibaraki Makoto	JICA Policy Advisor in MOC
	Ms. Đào Tố Cầm	Program Officer
JICA VSC Team	Mr. Mori Tamaki	JICA expert
	Mr. Kajiura Takeki	Team Leader of VSC Consultant
	Ms. Đỗ Thị Nga	National Project Coordinator - JICA VSC
	Ms. Đỗ Thanh Vân	VSC Team
	Ms. Tô Thị Kim Phụng	VSC Team
ATI - MOC	Ms. Mai Thị Liên Hương	Director General of ATI
	Ms. Đặng Anh Thư	Vice Director General of ATI
	Mr. Ngô Văn Yên	Officer
	Ms. Trương Thị Thanh Hương	Secretary
CUWC	Mr.. Bùi Hồng Huế	Reactor
	Ms. Vũ Thị Hoài Ân	Head of Urban Engineering
	Mr. Nguyễn Công Đức	Deputy Head of Equiment &Facilities Management Office
Hanoi DOC	Ms. Hoàng Thị Mai Hương	Vice Head of Technical Division
	Ms. Hoàng Thị Phúc Thảo	Officer
Maintenance Board for technical infrastructure works - Hanoi DOC	Mr. Hà Mạnh Hùng	Officer
HSDC	Ms. Nguyễn Thị Minh Tâm	Officer
Hanoi Construction, Investment on water supply, drainage, sewerage and environment PMU	Mr. Nguyễn Nguyên An	Vice Head of Planning Division
	Mr. Bùi Văn Linh	Officer
Ha Long PMU	Mr. Trần Minh Tuấn	Deputy Director
	Mr. Hoàng Văn Bằng	Officer
	Mr. Hoàng Văn Nam	Officer
Hai Phong PMU	Mr. Nguyễn Văn Thanh	Head of foreign fund using works management division

	Mr. Lưu Duy Sơn	Site Inspection Division
Hung Yen CPC	Mr. Doãn Quốc Hoàn	Vice Chairman
	Mr. Nguyễn Quốc Khánh	Head of Urban Management
Hung Yen DOC	Mr. Bùi Tuấn Minh	Officer
Thai Binh DOC	Mr. Phạm Trọng Đạt	Head of Technical Infrastructure Management division
Phu Ly CPC (Ha Nam province)	Mr. Trương Mạnh Hùng	Head of Urban Management
	Mr. Nguyễn Tiến Dũng	Vice Head of Urban Management
	Mr. Nguyễn Văn Học	Director of PMU
	Mr. Nguyễn Xuân Thủy	Deputy Director of PMU
Hoa Binh DOC	Mr. Trần Đại Hùng	Urban Development and Technical Infrastructure Division
	Mr. Đặng Xuân Tuyên	Urban Development and Technical Infrastructure Division
Phu Tho DOC	Mr Nguyễn Thành Nhân	Construction Management Division
Bac Giang CPC	Mr. Nguyễn Văn Thạo	Vice Chairman
	Mr. Chu Thúc Tiến	Urban Management Division
	Mr. Nông Bằng Sơn	PMU
Hanoi University of Architecture	Mr. Nguyễn Lâm Quảng	Faculty of Tchnical Infrastructure & Urban Environment
Institute on Science, Technique and Environment	Mr. Nguyễn Việt Anh	Parson
Representative from GIZ	Mr. Tim MacGrath	Program Director
Representative from ADB	Mr. Romain VIAVANT	Project Manager

Appendix 3. Photos of Activities in the Seminar

Opening of Seminar – DG. Mai Huong (ATI)	Opening Speech by Mr. Kitamura Shu (JICA VN)
	
Introduction of Attendants	Presentation by Representative of ATI
	
Presentation by Rep. Binh Duong PMU (Biwase)	Presentation by Rep. Buon Ma Thuot PMU
	

Presentation by Representative of ADB

Presentation by JICA Policy Advisor in MOC

Presentation by JICA Expert

Presentation by Representative of CUWC

Presentation by Representative of Sekisui Co.

Discussion in Seminar (1)

Discussion in Seminar (2)

Discussion in Seminar (3)

Discussion in Seminar (4)

Discussion in Seminar (5)

Discussion in Seminar (6)

Discussion in Seminar (7)

Photo of Seminar Overview

All participants on Seminar Closing Ceremony

Appendix 4. Power Point Presentations at the Seminar

APPENDIX-H

Report of the Training in Japan

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWERAGE WORKS (IMPLEMENTATION PHASE)

Training in Japan
Final Report

February 2019

Nippon Koei Co., Ltd. (NK)
Sewerage Business Management Centre

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY
OF SEWERAGE WORKS (IMPLEMENTATION PHASE)
Final Report of Training in Japan

Table of Contents

1. Overview of Training and Invitation 1
1-1 Purpose 1
1-2 Training Schedule 1
1-3 Participants 2
1-4 Overview of Training 3
2. Remarks on the Result of Training 5
2-1 Evaluation of Curriculum 5
2-2 Evaluation by Trainees 5

Appendix -1 Report of Lectures and Site Visits

Appendix -2 Training Plan

Appendix -3 Summary of Questionnaire

1. Overview of Training and Invitation

1-1 Purpose

Training in Japan is planned as a part of the project for enhancing management capacity of sewerage works which is currently ongoing by the JV company (Nippon Koei Co., Ltd. and Sewerage Business Management Centre). This project has been started to improve sewerage system in Vietnam based on the request from Vietnamese government to Japan International Cooperate Agency (JICA).

The objective of the training in Japan is extending the knowledges of management personnel and trainers of training to contribute to expand the sewerage system in Vietnam. Especially, it is aimed to spread the importance of improving of house connections and terminal pipelines. The main 5 training items are shown as below.

① Studying the example of house connection, which is one of the most important parts 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 canters 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

1-2 Training Schedule

The schedule of training in Japan is shown in Table-1. Detailed schedule is written in the training plan attached in the appendix-2.

Table-1 Schedule of Training in Japan

Date	Time	Contents
1/9(Wed)		Flight to Japan (Hanoi ⇒ Tokyo-Haneda)
1/10(Thu)	AM	Briefing by TIC
		Orientation of training course in TIC
	PM	Move (TIC ⇒ Sunamachi STP of Tokyo metro.)
	15:00 – 17:00	Training center of the Bureau of Sewerage in Tokyo metro.
	17:00 –	Move (Sunamachi STP ⇒ TIC)
1/11(Fri)	~10:00	Move (TIC ⇒ Takasaki City)
	10:00～12：00	Takasaki City Office (Lecture: sewer design system and database system)

	13:30～15：00	Takasaki City (Site visit: house connection site)
1/12(Sat)	-	Holiday (Tokyo)
1/13(Sun)	-	Holiday (Tokyo)
1/14(Mon)	AM	Trainees' discussion to prepare the future action plan at JICA Tokyo
	PM	Move (Tokyo ⇒ Nagoya)
1/15(Tue)	9:15～10:15	Nagoya city Waterworks & Sewerage Bureau (Lecture: Rainwater management)
	10:15～10:45	Courtesy call on a chief of bureau of Waterworks & Sewerage Bureau, Nagoya city
	11:15～11:45	Nagoya city Waterworks & Sewerage Bureau (Site visit: construction site of rainwater storage facility)
	13:30～15:00	Nagoya city Waterworks & Sewerage Bureau (Lecture: Sewer database system)
	16:00～17:00	Tamano Consultant (Introduction of database software)
	17:00~	Move (Nagoya⇒Kyoto)
1/16(Wed)	~10:00	Move (Kyoto⇒Otsu City)
	10:00～12:00	Otsu City (Site visit: house connection, sewer database system)
	12:00~14:00	Move (Otsu City ⇒ Ritto City)
	14:00～16:00	Sekisui Company (Site visit: Ritto factory)
	16:00~	Move (Ritto City ⇒ Okayama)
1/17(Thu)	~12:40	Move (Okayama ⇒Kochi City)
	12:40～16:30	Kochi City Waterworks & Sewerage Bureau (Site visit: Shimodi STP (PTF method), construction site of House connection)
	16:30~	Move (Kochi City⇒Tokyo)
1/18(Fri)	~9:30	Move (TIC ⇒ Toda City)
	9:30～11:30	Training center of Japan Sewage Works Agency (Lecture: management of training course, Observing training facility)
	11:30~13:30	Move (Toda City⇒ JICA HQ)
	13:30～16:40	Preparation and presentation of future action plan at JICA HQ
	16:45～	Wrap-up and closing ceremony
1/19(Sat)		Flight to Vietnam (Tokyo-Haneda ⇒ Hanoi)

1-3 Participants

Participants are selected as shown in Table-2. Trainers and management members of training course are selected as participants from the viewpoint of sustainable training course management in Vietnam.

Table-2 Participants

No.	Name	Organization and Position
1	Ms. Tran Thi Thao Huong	Head of Sewerage division of Administration of Technical Infrastructure, Ministry of Construction (MOC)
2	Ms. Do Thi Hong	Official, Department of Personnel and organization, MOC

	Mai	
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)

Ms. Do Thi Nga, International coordinator of JICA VSC Team employed by JICA Vietnam Office, attended the entire training course in Japan. All the trainees except Ms. Tran Thi Thao Huong from MOC had completed training and receipted completion certificate. She returned to Vietnam on 12th January because of illness.

1-4 Overview of Training

Overview of training is summarized as follows. The details of lectures and site visits including Q&A are in the appendix-1.

(1) Site Visit to Construction Site of House Connection

Trainees visited Takasaki city (11th January), Otsu city (16th January), Kochi city (17th January) to see the construction site of house connection. In Takasaki city and Otsu city, constructions of In-house drain pipes had been done when trainees visited, and completion inspection will be conducted by the city. Trainees were interested in the drainage facility.

Main pipe was under construction in Kochi city, and it was being connected to a tertiary pipe which is in the public-private boundary position. It was explained that the connection to the public inlet is implemented by each household's responsibility. The responsibility of the connection of public inlet differs according to the local governments. The actual promotion method of house connection, such as visiting individual homes, was explained by Takasaki city. Trainees have developed an understanding of the importance of explanation to the citizens.

(2) Usage Example of Sewerage Database

Overview of sewerage database, usage and example were explained in Takasaki city (11th Jan.), Nagoya city (15th Jan.), Tamano Consultant (15th Jan.), Otsu city (16th Jan.) Especially, in Nagoya city, trainees were able to practice the software , which was very effective training. Tamano Consultant introduced how consultants make use of sewerage database and example of installing it

to Vietnam.

(3) Observing Japanese Technology and Products applicable in Vietnam

Trainees had observed following Japanese technology and products which are applicable in Vietnem.

- Rainwater storage pipe/ shield method

Trainees visited construction site of rainwater storage pipe which is installed at the depth of 40 m of underground in Nagoya city. They were able to enter the starting shaft to have a look at a part of the pipe.

- VP pipe for sewer

Trainees visited Ritto factory of Sekisui Company to observe manufacturing process. VP pipes, inlet made from polyvinyl chloride and pipeline regeneration material which is used for SPR method and Omega Liner method were explained. Also, the activities of Sekisui Company in Vietnem was explained.

- Wastewater treatment method (Smaller Footprint and energy saving type)

Trainee visited Shimodi STP in Kochi city to observe PTF facility which installed by B-DASH project founded by MLIT. PTF was invented by Metawater Company.

(4) Training Center

Trainees visited training center of Bureau of Sewerage Tokyo Metropolitan Government on 10th Jan. and training center of Japan Sewage Works Agency on 18th Jan. Practical training facility and training method were introduced to them.

(5) Making Action Plan

Discussion among trainees as preparation of making action plan was conducted on 14th Jan. They made action plan which composed of short term and long term plan., and present it on 18th Jan. After the presentation, trainees and Japanese participants discussed each action plan. Schedule of action plan presentation is shown in Table-3

Table―3 Schedule of Action Plan Presentation

Time	Presenter	Organization and Position
14:40 – 14:55	Mr. Bui Hong Hue	Rector of College of Urban Works Construction (CUWC)
14:55 – 15:10	Mr. Pham Thanh Dat	Director of CNEE, CUWC
15:10 – 15:25	Ms. Vu Thi Hoai An	Deputy director of Training Center for Water & Environment Sector (CNEE), Deputy head of

		technical infrastructure of CUWC
15:25 – 15:35	Break	
15:35 – 15:50	Mr. Chau Ngo Anh Nhan	Director of Khanh Hoa Development Project Management Unit (KDPM)
15:50 – 16:05	Mr. Nguyen Thanh Phong	Deputy head of Water supply and sewerage Faculty, Architecture University
16:05 – 16:20	Ms. Do Thi Hong Mai	Official, Department of Personnel and organization, MOC

2. Remarks on the Result of Training

2-1 Evaluation of Curriculum

The main 5 training items were covered in this curriculum as explained above. A point to be improved is to insure enough time for discussion and review. This curriculum includes too many items in the short period, also travel time was too long.

2-2 Evaluation by Trainees

Summary of trainees' answer to questionnaire is as follows.

(1) Progress Status of training items

Answers to the question "Do you think you could achieve 5 training items?"

Item1 : Fully achieved (4), Achieved (2), Almost achieved (0), Not Achieved (0)
Item2 : Fully achieved (2), Achieved (4), Almost achieved (0), Not Achieved (0)
Item3 : Fully achieved (4), Achieved (2), Almost achieved (0), Not Achieved (0)
Item4 : Fully achieved (6), Achieved (0), Almost achieved (0), Not Achieved (0)
Item5 : Fully achieved (2), Achieved (4), Almost achieved (0), Not Achieved (0)

Answers show that the progress status of training items is high.

(2) Design of Training Course

1) Answers to the question "Do you think the design of this training is appropriate for you or your organization to achieve sewerage project goals?"

Very appropriate (1), Appropriate (5), Acceptable (0), Not appropriate (0)

2) Answers to the question "Is the training period appropriate?"

Long (1), Appropriate (5), Short (0)

3) Answers to the question “Is the number of participants of this training appropriate?”

Too many (0), Appropriate (5), Too few (1)

4) Answers to the question “Did you learn from the experiences of participants of this training?”

Learned a lot (0), Learned some (5), Learned few (1), Not learned (0)

5) Answers to the question “Did you get the chance to have practical training?”

Yes, very much (3), Yes (3), No (0), Not at all (0)

6) Answers to the question “Did this training course offer you the chance to join the activities in a responsible way, for example discussion and workshop?”

Yes, very much (4), Yes (2), No (0), Not at all (0)

7) Answers to the question “Was the lecture comprehensible and high quality?”

Yes, very much (3), Yes (4), No (0), Not at all (0)

8) Answers to the question “Was the textbook and other training material satisfactory?”

Yes, very much (5), Yes (1), No (0), Not at all (0)

9) Answers to the question “Do you think the knowledge and experience which you obtained in this training is useful for your future work?”

Yes, very much (5), Yes (0), No (1), Not at all (0)

10) Answers to the question “Was the facilitation, for example in the lecture and action plan, appropriate to commit the training goals?”

Yes, very much (6), Yes (0), No (0), Not at all (0)

Judging from the results above, the evaluation by trainees is high.

Points to be improved which suggested by trainees are as follows.

① Break time between the lectures is too short. It should be more than 10 mins. Also, discussion time should be provided in each lecture.

② The accuracy of Vietnamese translation should be improved, especially for technical terms, so that trainees can understand correctly.

③ There were many overlapping contents. For example, site visit to house connection and introduction of sewage database were conducted for 3times respectively. Instead of them, advanced technology should be introduced.

Appendix

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWERAGE WORKS (IMPLEMENTATION PHASE)

Training in Japan
Report of Lectures and Site Visits

THE PROJECT FOR ENHANCING MANAGEMENT CAPACITY OF SEWERAGE WORKS (IMPLEMENTATION PHASE)

Report of Lectures and Site Visits

Table of Contents

1. Program Orientation 1
2. Training Center of the Bureau of Sewerage in Tokyo Metropolitan 3
3. Takasaki City Sewerage Bureau 7
4. Discussion for Making Action Plan 13
5. Nagoya city Waterworks & Sewerage Bureau 17
6. Tamano Consultant 21
7. Otsu City Water, Sewage and Gas Bureau 24
8. Ritto Factory / Sekisui Company 26
9. Kochi City Waterworks & Sewerage Bureau 28
10. Training Center of Japan Sewage Works Agency 31
11. Presentation of Action Plan 35

1. Program Orientation

Date : 13：15~14：00　January 10th, 2019

Place : JICA Tokyo center　SR409

Lecturer: Mr. Fujisawa / JICA Tokyo center, and others

(1) Overview

Mr. Fujisawa explained the schedule of training course in Japan. The main 5 training items are as follows.

① Studying the example of house connection, which is one of the most important parts 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 canters 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

(2) Q&A and Comment

From Mr. Hue

- Participants are composed of 7 members. 4 members are related to training course in Vietnam, 2 members are from MOC and a member from Project management unit (KDPM).
- I would like to learn how to develop human resource and a sewerage policy of VSC in order to enhance the management capacity of sewerage works.
- It is a great opportunity because Japanese sewerage system is well developed.
- During this training, I would like to take pictures and get documents as much as possible.

From Mr. Nhan

- I am from PMU of Nha Trang province and interested in the item 1~3.
- I am also interested in the method of following items.
  - Tariff collection
  - O&M of sewerage facility
  - Contract of work consignment
  - Sewerage database with GIS

Program Orientation

2. Training Center of the Bureau of Sewerage in Tokyo Metropolitan

Date: 15：00~17：00　January 10th , 2019

Place: Training Center of the Bureau of Sewerage in Tokyo Metropolitan

Lecturer: Mr. Hiyama / Director of training center of the Bureau of sewerage in Tokyo Metropolitan, and others

(1) Overview

Mr. Hiyama gave an overview of Training Center of the Bureau of Sewerage in Tokyo Metropolitan as follows.

- This center was founded in October 2013 for the officers of the Bureau of Sewerage in Tokyo Metropolitan government, so that they can learn the method of O&M.
- There are 33 sorts of training facilities which are operated by Tokyo Metropolitan Sewerage Service Corporation.
- About 20,000 people visited this training center in 5 years.

(2) Observing Facilities

Trainees observed the following facilities with explanation by 3 instructors.

- Facilities related to civil engineering
  1) High place working
  2) Pipe inspection by TV camera
  3) Practical training in a manhole
  4) Structure of manhole
  5) Walking in a pipe
  6) Deterioration of concrete
  7) Concrete placing
  8) Construction by open cut method
  9) Pipe renewal method

- Facilities related to machine
  1) Structure of wastewater treatment
  2) Laboratory equipment for wastewater treatment
  3) Operation simulation apparatus
  4) Electrical facility
  5) Pump repair simulation apparatus
  6) Pump performance testing apparatus

(3) Q&A and Comments

From Mr. Hue

I am impressed by the scrupulous explanation about training facilities. My questions are as follows.

Q1: Who are the target trainees for automatic controller? University graduates?

A1: Any educational level accepted. Those who are not expert in the field can participate the training as well.

Q2: How did you create the simulating software?

A2: The basic flow was made by TGS, and programming was outsourced to professionals.

Q3: Is the certificate of this training at Training Center of the Bureau of Sewerage in Tokyo Metropolitan illegally valid?

A3: It can be used to certify your completion of this training course; however, it is not national qualification.

Q4: Are there visiting lecturers?

A4: Yes, TGS selects them from the viewpoint of profession. They are from universities and manufactures.

From Ms. An

Q1: Is the training period of electric machine decided according to their profession?

A1: Basically no, but the speed of explanation by a lecturer changes.

From Mr. Nha

Q1: Please let me know the website of television camera inspection and pipe renewal method.

A1: Okay, it will be emailed to you through a Japanese person in charge.

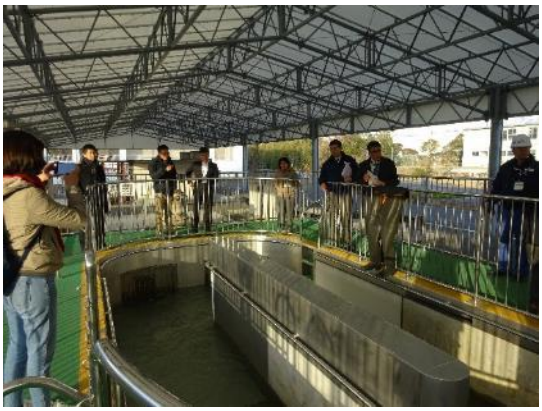
Overview lecture

Lecture

High place working

Practical training in a manhole

Structure of manhole



Walking in a pipe

Construction by open cut method

Laboratory equipment for wastewater treatment

Pump repair simulation apparatus

Group photo

3. Takasaki City Sewerage Bureau

Date: 10：00~16：00 11th January, 2019

Place: Takasaki city office, Construction site of house connection, Water quality measurement point

Lecturer: Mr. Noguchi / Takasaki city Sewerage department General affairs division, and others

(1) Overview of Sewerage system in Takasaki City (Mr. Terumasa NOGUCHI / General affairs division, in charge of planning)

Mr. Noguchi explained the overview of sewerage system in Takasaki city. Questions and Answers are as follows.

From Mr. Phung

Q1: I have learned that the rainwater drain pipe is 28.8km long. Is the drainage system separate sewer system or combined sewer system?

A1: There are both separate and combined sewer systems. For the combined sewer system, rainwater which maximum volume is 3 times larger than that of sewage is intercepted to the STP, extra rainwater is drained to the river.

Q2: In the area rainwater pipe is installed, is it separate sewer system?

A2: Yes.

From Mr. Hue

Q1: Japan had developed river-basin sewerage system in 1980's. Vietnam has tried to do it as well, however it was difficult to arrange local governments. How did Japan manage it?

A1: Arrangement has been conducted at the prefectural level.

Q2: Which organization is in charge of developing river-basin sewer pipes?

A2: Main pipe is implemented by the prefecture, connecting pipe is done by the city.

Q3: What is the reason of the fluctuation of water quality improvement indicator in 2007?

A3: It is depending on the climate.

Q4: The data must be an average of sampling data, therefore I suppose that it is effected by an accident or drainage water from a factory.

A4: The detail is unknown because the data sampling and analyzing were conducted by the other department. However, we believe that water quality has been improved gradually.

From Mr. Dat

Q1: What is the total treatment capacity of 3 STPs?

A1: Let us report you later.
Q2: The public sewerage user is 273,766. Why rest of the residences cannot connect to the sewerage system?
A2: They use Jokaso and septic tank. Also some cannot afford to connect to public sewerage system.

(2) Design of Sewer Pipe and Sewerage Database
Mr. Watanabe, who is in charge of sewerage facility development, explained the sewer pipe design, and Mr. Horigome, who is in charge of O&M, explained the sewerage database. Questions and Answers are as follows.
From Mr. Nhan
Q1: Who does input information to the database? Contractors provide officers of the local government with information of pipelines, and officers input information to the database?
A1: We extracts necessity information from the final report which contractor submit when the construction completed. After that, the extracted information is input to database by O&M department.

Q2: Is it possible for citizens to access the sewerage database? If it is possible, is it free of charge?
A2: Yes, they can access to the database for free, but only sewer pipe information. They cannot access to information of contractors.

(3) Notification of services commencement (Mr. Terumasa NOGUCHI / General affairs division, in charge of planning)
Mr. Noguchi explained the notification of services commencement. Question and Answer is as follows.

From Ms. An
Q1: Is it inconvenient that citizens can open to public inspection only at sewerage bureau?
A1: Pipe construction is implemented in front of household, therefore citizens get information about it at the moment. Also, notification of services commencement is sent to each household.

(4) Activity for promoting house connection (Mr. Yusuke MURAIDA/ Sewerage development division, in charge of PR)
Mr. Muraida explained the activity for promoting house connection. Questions and Answers are as follows.
From Mr. Nhan
Q1: Is there penalty if they do not implement house connection? Is there distinction between household and enterprise such as factory?
A1: No there is no penalty in Takasaki city although it is regulated by sewerage law. There is not distinction between household and enterprise such as factory either.

Q2: The house connection rate of enterprise and household are 80% and 15 % respectively. I consider applying penalty system to improve connection rate in Nah Trang. For example, to raise the tax of environmental conservation for 10 % for those who does not implement the house connection. How do you think of this idea?
A2: In the case of Takasaki city, interest subsidies are applied. All interest is covered by it if they implement house connection within 3 years. Half of interest is covered if it is within 5 years. There is no subsidy if house connection is implemented 5 years later from the notification.

Q3: High-income people do not implement house connection.
A3: We do not force citizens to implement house connection if there are special reason. We promote house connection by asking citizens cooperation.
From Ms. An
Q1: Do you apply subsidy for construction cost not only interest subsidy?
A1: No.

From Mr. Phung
Q1: Combined sewerage system is applied in Hanoi, and waste water treatment is not perfect. Residents do not implement house connection even if separate sewerage system is installed as Ha Long city.
A1: We ask residents to implement house connection to prevent waste water from directly discharging to the river.

From Mr. Dat
Q1: What is the ratio of residents who comply with request of house connection out of 3,000 visits per a year.
A1: Our target ratio is 10 %, but it is about 5 %. There are some cases: one is that once one house hold implements the house connection, residents nearby conduct the house connection one after another. The other case is that nobody complies with our request even if we visit them many times.

(5) Demonstration of Sewer Pipeline Design System and Sewerage Database
Demonstration of sewer pipeline design system and sewerage database were conducted. Question and answer are as follows.
From Mr. Phung
Q1: What is the basis of gradient 2 ‰?
A1: It is set by flow velocity.

(6) House connection (Mr. Hirokazu YAMAUCHI / O&M division, in charge of drainage facility)

House connection was explained. Questions and answers are as follows.

From Mr. Phung

Q1: In your explanation, the connection of sewer was mentioned but rainwater. How do you treat rainwater?

A1: It is drained to side ditch of the road. Separate sewer system is recommended in Takasaki city although there are combined sewer system areas.

From Ms. Mai

Q1: Which organization implements inspection for construction completion?

A1: Bureau of sewerage does. It is implemented within 5 days from their application.

From Mr. Dat

Q1: Do designated manufactures conduct application and inspection for completion on behalf of residents?

A1: Yes, designated manufactures do them after making contract with residents.

From Ms. Mai

Q1: Are there brunches under the bureau of sewerage?

A1: Yes, there are 5 brunches, and each of them has customer center to accept applications.

From Mr. Hue

Q1: Adjacent houses consign their work to different manufactures. Do they consign their work to same manufacture?

A1: In general, drainage facility is installed in each building. In some cases, drain water is mixed in the public inlet.

From Mr. Phung

Q1: A connecting pipe is shared by several households because the buildings are connected in Vietnam.

A1: Inlet is installed for O&M, it is necessary for cleaning.

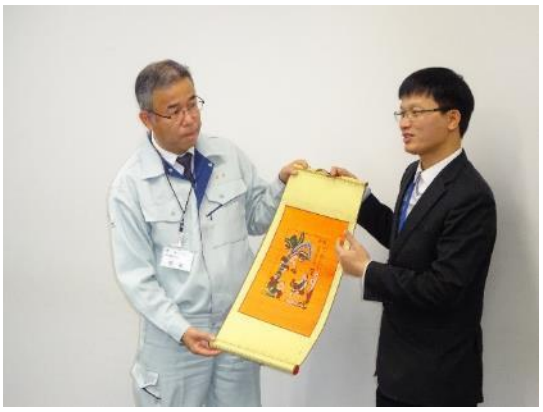
Q2: Drain pipe is directly connected without inlet, since there is not enough land to install inlet in Vietnam.

A2: In some case, a connecting pipe is installed under the buildings, however, inspection door is installed.

(7) Site Visit

Trainees visited the construction site of house connection and water quality measurement point.

Lecture



Gift from trainees

House connection

House connection

House connection

Manhole

Water quality measurement point

Water quality measurement point

4. Discussion for Making Action Plan

Date: 10：00~11：40 14th January, 2019

Venue: JICA Tokyo center SR305

Lecturer: Mr. Kajiura / Nippon Koei

(1) Overview

Mr. Kajiura explained how to make action plan. Points are as shown below.

- The time for preparing is 13：30～14：30 18th (Fri) January. Presentation will be 10 to 15 mins per each person including translation.
- Action plan shall be composed of item left an impression, short term plan (1 year), long term plan (5 to 10 years).
- Contents can vary from person to person since trainees are belong to different organizations.

(2) Questions and Answers

From Mr. Hue

Q1: Is the number of slides 4?

A1: There is no limitation of slide pages, but please be punctual for presentation time.

Q2: What is the presentation order?

A2: Hue⇒Dat⇒An⇒Nhan⇒Phong⇒Mai. It was decided by discussion among trainees.

From Mr. Kajiura

Comment: We would like to have a session for reporting this training after your going back to Vietnam. We would like to invite DG from ATI and JICA Vietnam office to the session.

From Mr. Hue

I will make a report to submit to MOC. I will also feedback the evaluation by trainees. I would like you to let us know the evaluation from Japanese side as well.

From Mr. Nhan

I do not want to be evaluated. I do not need an evaluation by MOC.

From Ms. Mai

I am from the department of human resources in MOC. I had tried to establish VSC with ATI, but it failed. It will be done after a law is made. I would like to know the regulation relating to sewerage system and the process of JS establishment in Japan.

From Mr. Kajiura

I would like to ask Ibaraki JICA expert about sewerage law.

(3) Concept of Actin Plan

Comments on the action plan by trainees are as follows.

From Mr. Phung

- About short term plan

I would like to tell my colleague to my experience and knowledge obtained in this training. Also, I would like to contribute an article to a journal.

- About long term plan

I would like to join VSC in Vietnam if possible.

From Mr. Nhan

We have a budget to build up GIS system in Nha Trang.

- About short term plan

I would like to consign the work of database building up to consultant. A part of Nha Trang city should be imported to the GIS system.

- About long term plan

The GIS system is expanded. The house connection is regulated, in practical the rule about the designated manufactures, to raise the ratio of house connection.

From Mr. Hue

- About short term plan

I would like to implement personnel shift and facility reallocation to develop human resources of sewerage system.

- About long term plan

I would like to transfer CNEE in CUWC to VSC when it is established. Otherwise, the training function should be included in CNEE.

From Mr. Dat

- About short term plan

① Share the experience with colleague in CNEE
② Rebuilding of CNEE
③ Building up of curriculum based on the knowledge obtained in this training
④ Participate in TOT of design course

- About long term plan

① Establishment of VSC along CUWC lines

② Training of trainer

③ Establishment of training course for local government officers and enterprise staff

From Ms. An

・ About short term plan

① Add the subject about safety of sewerage construction to design course

② Introduction of database software in the design course

・ About long term plan

Rebuilding of CNEE to strengthen marketing.

From Ms. Mai

・ About short term plan

I will report to my boss and colleague about my experience in this training.

・ About long term plan

I would like to cooperate when the VSC is established. I am interested in the procedure of application of house connection and river-basin sewerage system.

(4) Others

Mr. Kajiura asked about the budged of training course after the JICA project completion.

From Mr. Kajiura

Can you make use of subsidy from the government?

From Ms. Mai

No. In case of training course of city management which educates executives of local government, the cost of lecturer is covered by government. However, other cost is covered by local government.

From Mr. Kajiura

At this moment, training cost is covered by JICA project, but it is better to be supported by the government after the project completion.

From Ms. Mai

Government can dispatch lecturers but not able to cover training cost. Even if there is subsidy from the government which depends on the financial ability of each ministry, the amount is very limited and not enough to cover all the training cost. For example, it can only cover meal and accommodation fee. In some cases, training courses are conducted at central government.

From Mr. Kajiura

How is the case which CWUC dispatch lecturers?

From Ms. Mai

MOC can cover the cost of lectures. However, it is for the subject of city management (city infrastructure, water supply and sewerage) which is the original program by government. Therefore, it cannot be applied to the sewerage training course unless it is combined with city management.

5. Nagoya city Waterworks & Sewerage Bureau

Date: 9：15~15：00　15th January, 2019

Venue: Nagoya city waterworks & sewerage bureau Fukue branch office

Lecturer: Mr. Kenichiro YASUDA / Nagoya city waterworks & sewerage bureau, sewerage division and others

(1) Overview

Trainees visited following facilities in Nagoya city.

- Overview of Nagoya city waterworks & sewerage bureau
- Courtesy call on a head of waterworks & sewerage bureau
- Construction site of rainwater storage facility
- Sewerage database

(2) Overview of Nagoya City Waterworks & Sewerage Bureau and Rainwater Storage Facility

Mr. Katsuragawa, planning and accounting department, gave an address of welcome. Mr, Yasui from planning department and Mr. Wakai from sewerage planning division explained the overview of Nagoya city waterworks & sewerage bureau and rainwater storage facility. Questions and answers are as follows.

From Ms. An

Q1: What is the water content ratio of sludge before incinerating?

A1: It is 78%. Water content of incineration ash is 1%.

From Mr. Phung

Q1: Please tell me the difference between rainwater bearing basin and rainwater reservoir.

A1: rainwater bearing basin is aimed to store initial rainwater which is dirty water. Rainwater reservoir is aimed to prevent rainwater from overflowing, so rainwater storage pipe is also included. There is facility which has both roles; rainwater bearing basin and rainwater reservoir.

(3) Courtesy call on a head of waterworks & sewerage bureau

Trainees visited Mr. Miyamura who is a head of waterworks & sewerage bureau. Mr. Miyamura and Mr. Hue from CUWC's speeches are as follows.

Mr. Miyamura

Hello everyone, I'm Miyamura, a head of waterworks & sewerage bureau. Welcome to Nagoya city. Water supply and sewerage system in Nagoya city are important infrastructures to support residents in the city, and it has more than 100 years of traditional history. They must work continuously for 24 hours a day, 365 days a year. To do so, we have been working on build up countermeasure for the

aging facilities and disasters based on our knowledge and technology.
Your country and Nagoya city have deepened great relationship especially in the field of water supply by sending and accepting trainees for the JICA training.
I heard that you are going to learn the knowledge to establish VSC in Vietnam through this training in Japan. I would like you to observe the construction site of rainwater reservoir in the center of Nagoya city, and in the afternoon, I would like to show the sewerage database system. I am glad if your visit to Nagoya city helps you to improve sewerage system in Vietnam.
I also heard that you are going to go to Kyoto after this site visit, which I think it is hard schedule. Moreover, it is very cold today. Please take care of yourself. I hope your rest of the training in Japan will become fruitful. Thank you very much.

Mr. Hue
Thank you very much for having us to your city. We are from MOC, CUWC and Khang Hoa province. I understand that this is a part of support to Vietnam. We have visited Training Center of the Bureau of Sewerage in Tokyo Metropolitan, and learned a lot such as waste water treatment method, construction and related technology. We would like to make use of these knowledge and experience we obtained to improve the sewerage system in Vietnam. On behalf of trainees, I would like to express my sincere appreciation for your warm reception and providing the opportunity to have great lecture and site visit. I hope our relationship expand. Thank you very much.

After their speech, executives of Nagoya city were introduced to the trainees, and then they had a pleasant chat.

From Mr. Hue
3 of trainees are from CUWC, which is national college, and I am a rector. There are the subject of water supply and sewerage in CUWC. CUWC and MOC have tried to establish VSC with the support from JICA. This center will have a role of cultivation of human resources related to sewerage system in Vietnam. It is worthwhile to have training in Japan to establish VSC.
I hope you will visit CUWC one day.

About the present from Vietnam, this pattern is Bunbyo university which is the first university established in 1070 in Vietnam

(4) Site Visit to The Construction Site of Rainwater Storage Facility
Trainees visited Oshikiri Park where the starting shaft of rainwater storage pipe is located.
The rainwater reservoir, which is the countermeasure for 60 mm/hr rain, is under the construction. Minister of MILT Mr. Ishii has visited. You are the first visitor from overseas. The overview of

construction is as follows.

- Construction subject: Construction of rainwater storage pipe in Nagoya city (II)
- Period: from 20th September 2018 to 17th March 2021
- Construction cost: 200 billion yen
- Method: Mud pressure shield method
- Overview of the facility: Diameter 5,750mm, Length 5,000m, Storage volume 104,000m3, Earth covering 45~55m, Gradient 0.5 ‰
- Soil quality: Gravel accumulation layer (90 % of them is quartz/ hard soil quality)
- Segment: Synthetic segment (steel shell filled with concrete)
- Exchange of cutter bit: Twice. Soil improving is done by freezing method
- Starting shaft: 50m constructed by pneumatic caisson

(5) Sewerage Database System

Mr. Goto gave trainees a lecture about sewerage database system at Fukue building, Nagoya city waterworks & sewerage bureau. Trainees actually operated the mapping system of water supply and sewerage. Questions and answers are as follows.

From Mr. Nhan

Q1: Can residents inspect this system?

A:1 No, only officer can.

Q2: It seems there is WEB. What is that?

A2: It is for the internal network of waterworks & sewerage bureau.

Q3: Cab you check the system by mobile even though it is internal?

A3: We have license, but it is not implemented yet.

Q4: The necessity of repair is shown in 3 steps A, B and C in the mapping system. Does it alarm automatically?

A4: No.

From Mr. Phung

Q1: Is there any regulation about dimension? I saw m and mm.

A1: It depends on each local government. We use m and mm in Nagoya city.

Q2: I have seen two types of number display regarding of decimal place. Some are written in second decimal place, others are in third decimal place. What is the distinction?

A2: It is general way in Nagoya city and in Japan.

From Mr. Dat

Q: There are 5 layers. Is 3D display possible?

A: No

Lecture

Group photo when the courtesy call

Starting shaft of rainwater storage pipe

Sewerage database system

6. Tamano Consultant

Data: 16：00~17：00 15th January, 2019

Venue: Tamano Consultant headquarter 5 F corroboration area (East)

Lecturer: Mr. Minoru IWAI / A head of geographic spatial information department and others

(1) Welcome Speech from Mr. Nishimura/ CEO

Sewage coverage is more than 80% in Japan, and there are many facilities which exceed their durable years/50 years. The management of pipes made from concrete is problem. Information of construction and O&M is necessary for the effective management. Today, I would like to introduce our system which is for the appropriate information management. I am glad if it helps you. I pray that the sewerage system in Vietnam is developed.

Thank you very much for visiting us today.

(2) Overview of Company

Tamano Consultant has worked on the consulting service related to urban development and 65 years history. We provide engineering solution for plann, design and construction administration. We joined Nippon Koei Group in 2005. Now that the number of employees is 687 and 205 of them are professional engineer.

(3) Sewerage Management System

Tamano Consultant has installed sewerage management system in 18 cities including Ha Long city in Vietnam. It will be installed it in Kita-Ibaraki city in this year. Also, we implemented the training of trainers of this system at CUWC.

(Purpose of Installation and overview of system)

The construction period of sewerage facility is short compared to the period of O&M. The O&M status of sewer is not easy to grasp because it is under the road. The purpose of installation of sewerage management system is to make sewer pipes visible. You can conduct repairment and renewal of sewer pipes based on the O&M and diagnosis recorded on this system. Sewer pipes have become deteriorated underground. They need appropriate O&M otherwise cave-in of a road will be caused. Inspection is implemented by CCD/TV camera. The information is recorded with location information.

Stock management plan is formulated by using information stated above, which is important to operate and maintain the facilities which is installed more than 50 years ago.

Now, the sewerage system has been rapidly developed in Vietnam. They may become deteriorated faster than those of Japan. It is crucial to grasp the process of construction properly and manage the facilities by simulation system. (System installed in Ha Long city is introduced.)

(Introduction of Stock Management Tool)

This tool can computerize the information of facilities. An object pipeline is extracted, and output based on the construction year. In the stock management support tool, the management of data is done by spread sheet. The procedure is Install of data ⇒ Risk evaluation ⇒ Deterioration prediction ⇒ Investment scenario (according to agency)

By using GIS and spread sheet, status can be evaluated visually. The features are as follows.

① Easy to operate
② High working efficiency
③ It can be customized depends on client's demand
④ It can be offered through NKV/ Vietnamese local subsidiary

Questions and answers are as follows.

From Mr. Hue

Q: We have introduced this system at CUWC. Vietnamese government focuses on the development of sewerage system, and STPs and sewer pipelines are under construction. Are you trying to sell GIS software in Vietnam?

A: We are planning to do it in the future. Currently we are not doing business only in Ha Long city and CUWC.

Comment: I would like to introduce your company in the sewerage training course which not only government officer but also company employees.

From Mr. Nhan

Q1: I have introduced this system by Tamano Consultant in Nah Trang city, and also I have introduced database system in this training. I understand that there are various system and the way of updating methods are different as well. Does this happen because there is no regulation for database system? Do the owners of software ask manufactures to update theirs?

A:1 Database system is regulated by law of sewage. The update is done by manufactures. The system which Ha Long city has is possible to be updated by the local government officer by themselves.

Q2: I proposed that database should be updated through cloud service in the training course in Nah Traing city.

A2: Now the cloud system in Japanese language is under development, and it will be completed in June. We are also considering to invent Vietnamese language version.

Lecture

A gift from trainees

7. Otsu City Water, Sewage and Gas Bureau

Date: 9：50~12：00 16th January, 2019

Venue: Otsu city water sewage and gas bureau, construction site of house connection

Lecturer: Mr. Masahiro KITAMURA / a head of sewage division and others

(1) Welcome Speech from Mr. Yamagiwa / from public corporation

Welcome to Japan and Otsu city. Good morning.

I would like to give you a warm welcome, all the way from Vietnam to Otsu city for the JICA project. Otsu city has Lake Biwa which is the largest area and storage in Japan. We have started to develop sewerage system to protect the water quality of Lake Biwa before Shiga prefecture takes measure.

The sewage coverage is 98.4% (2018 April), and we will continue to make effort for the environmental conservation.

Please take care of yourself during your stay, and enjoy the nature, history and interaction with citizens in Otsu city.

In the end, I pray for everyone's great happiness and health, and Vietnam and Japan's further development.

(2) Overview of Sewerage System City and Sewerage Database System in Otsu

Mr. Kitamura explained the overview of sewerage system and sewerage database system in Otsu city.

- Otsu city has started to develop sewerage project in 1962, and wastewater treatment has begun in April 1969.
- Otsu city has implemented projects for countermeasure of combined sewer. Rainwater storage pipe and interceptor were installed to reduce the volume of combined sewer overflow.
- Sewage database, such as sewer pipe, manhole and house connection, is digitalized with GIS information, and residents can inspect it.

Questions and answers are as follows.

<u>From Mr. Phung</u>

Q1: Is there storm water reservoir other than rainwater storage pipe?

A1: No. When the water level reach at the certain point, water flows into the rainwater storage pipe.

Q2: What is the pie under the rainwater storage pipe?

A2: It is an interceptor.

Q3: What is its gradient?

A3: 1‰

<u>From Ms. Mai</u>

Q: How do you deal with cross connection between water supply pipe and sewer pipe?
A: The problem is cross connection between sewer and rainwater drain pipe. We instruct residents to implement construction by their personal expense if cross connection is found. We also check it when completion inspection.

From Mr. Dat
Q: How do you control construction quality of house connection? Is it guaranteed by companies?
A: Construction companies must apply to us to implement house connection every 5 years. We can check the companies at that time. Construction company must submit a drawing to be checked by us before they begin construction. After the construction, we inspect the water flow on each connection.

(3) Construction Site of House Connection
Trainees visited several construction sites of house connection which is in completion inspection waiting status in Otsu city. Deodorizing inlet which is a kind of sewage inlet is installed for the drain from kitchen to separate oil. Connection inlet to the public sewer pipe is installed in each private property area. It is constructed by Otsu city under the agreement with owners.

Lecture

House connection

8. Ritto Factory / Sekisui Company

Date: 14：00~16：20 16th January, 2019

Venue: Ritto factory/ Sekisui company

Lecturer: Mr. Hideyuki NASU / Engineering center, and others

(1) Overview of Ritto Factory

Mr. Erami who is a head of engineering center explained Ritto factory.

- This factory which area is 160,000m^2 was established in 1960, and VP pipes are produced at this factory.
- There are 700 of employees, 500 of staff for production line, 140 of researchers and 60 in back office.
- We produce pipes and renewal materials.

After the lecture, trainees observed factory, pipe flattening test and displays.

(2) Introduction of Products for Vietnam.

Mr. Kaneko who is a deputy general manager explained their products such as inlet, renewal materials for SPR and Omega Liner, FRPM pipe and cross wave.

Sekisui company established Sekisui Vietnam in 2014, and opened local office in Hanoi and HCMC. Sekisui Vietnam and TIEN PHONG company made business alliance. Sekisui Vietnam sells products which TIEN PHONG company produces.

Questions and answers are as follows.

<u>From Mr. Nhan</u>

Q1: Does the cost of inlet differ depending on the materials; concrete and plastic?

A1: Plastic is more expensive as a product, however it has excellent workability. Therefore, it can shorten the construction period, which means that the cost for a whole construction is cheaper. Please contact Sekisui Vietnam to check a unit price.

Q2: How much is the road bearing capacity for vehicle?

A2: It is 12kN, which can stand for vehicle. Cast iron cover which is produced by the manufacture in Vietnam is used for the larger road.

Lecture

Lecture

Display room

VP pipe flattening test

9. Kochi City Waterworks & Sewerage Bureau

Date: 12：40~16：30 17th January

Venue: Construction site of sewer pipe, Shimodi STP

Lecturer: Mr. Shinya MATSUMOTO / Sewerage division

(1) Construction Site of Sewer Pipe

Trainees visited construction site of sewer pipeline in Atagoyama area Kochi city. Ms. Shiori Ando from sewer division explained the overview of the construction. A main pipe (φ150 × 480m) and connection pipes for 43 households are installed in this construction. The construction period is from 22nd September, 2018 to 15th February 2019. The construction speed is 100m per month. The contract price is 50,900,000 yen. The construction unit price is 100,000 yen per m. In case of Kochi city, the construction of house connecting pipe by the public-private boundary is implemented by Kochi city. Construction cost of drainage facility located in each household is covered by themselves.

(2) Shimodi STP

Mr. Myojin who is a head of sewerage division gave a welcome speech to trainees. After that, Mr. Miyata who is a senior manager of Metawater Company explained PTF/Pre-treated Trickling Filter which is installed in this STP.

- PTF uses filtration instead of initial and final sedimentation pond. Trickling filter is used in stead of aeration tank.
- The discharge water quality of PTF is same with CAS. Energy consumption is reduced from 0.3kwh/m^3 to 0.05kwh/m^3.
- Pilot demonstration was conducted in Da Nang from November 2012 to January 2014.
- In Japan, the experiment using the actual facility is conducted in Shimodi STP as B-DASH project from July 2014 to March 2016.
- There were 10 STP that trickling filter was installed in Japan. However, they were changed to other treatment method because of the bad discharge water quality, odor and flyers. Therefore, they had improved its system.
- PTF (2,000m^3 per day) is installed and started running in Hoi An as JICA ODA project in November 2018.

Questions and answers are as follows.

<u>From Mr. Phung</u>

Q1: Could you tell us the detail of FSF?

A1: Length is 7mm and thickness is 4 mm. Specific gravity is 0.5. This is the sample.

Q2: Does the specific gravity change?

A2: No, but it become about 1.0 when oil adheres.

Q3: What is the thickness of filter?
A3: It is 60 cm. Clogging occurs at the bottom of the filter since water flows from the bottom to surface.

From Mr. Nhan
Q: What is the maximum capacity for PTF method?
A: Treatment capacity is 6,750m^3 per day in case of Kochi city. 1,000m^3 per day for one unit, so necessary capacity can be covered by combining units.

From Ms. An
Q1: How much is the treatment cost?
A1: Electricity is 0.045kwh/m^3.

Q2: How much is the media?
A2: There is no unit price for the media because it is a part of the system.

From Mr. Dat
Q1: How does oxygen provided to trickling filter?
A1: Oxygen is dissolved to the sewer by the natural pressure when the inflow flowing down through trickling filter.

Q2: Is it necessary to top up the media? Or is it needed to exchange them all?
A2: The durable year of media is 15 years which is the Japanese standard. Within 15 years, the supplement of media is not necessary. A whole system is exchanged every 15 years. Accessories such as fan and pump also need to be exchanged.

After the Q&A session, trainees observed PTF facility. In the end, Mr. Hue gave a speech as follow.

I appreciate your arrangement today. I would like to introduce PTF to Vietnam based on the track record in Hoi An.

Construction site of house connection

Construction site of a main sewer pipe

Construction site of a main sewer pipe

Construction site of a main sewer pipe

Lecture at Shimodi STP

Observing of Shimodi STP

10. Training Center of Japan Sewage Works Agency

Date: 9：30~11：30 18th January, 2019

Venue: Training Center of Japan Sewage Works Agency

Lecturer: MR. Toshihiro YOKOYAMA / A head of training division, and others

(1) About Training Center of Japan Sewage Works Agency

Mr. Yokoyama explained the overview of Training Center of Japan Sewage Works Agency.

JS was established for preventing pollution such as water pollution in 1972. Our activity consists of project support, technical support and technical development support. 2 thirds of members are regular employment and 1 third of members are sent from local government. Most of the members are sent from local government at the time this agency was founded. Half of them are civil engineers and mechanical engineers and electrical engineers are 15 % respectively. There are 2,000 STP in Japan. 70 % of them have been supported by JS.

JS training center offers training courses related to sewerage projects for local government officers. They cover variety of field such as planning, design, construction, O&M and financial management. Also, actual trainings and exercises are provided in the training course. Trainees stay in the dormitory to cultivate their relationship in other words; OJT group training. Lecturers are JS employees or visiting lecturers who is mainly in charge of O&M lecture. We also conduct training course in remote area, training for companies and seminar. The curriculum has been changed with the demand. Now that, the main point is moved from constructing a new facility to asset management and O&M.

The total number of trainees are more than 70,000 in 43 years as of 2015. The number of training course was 17 when this agency was established, and now we have 53 training courses.

JS training center also provides qualification examinations. There are 4 fields; planning, design, construction, O&M and O&M of sewer pipe.

There is a dormitory (a room are for 8 persons), a reference room, water quality laboratory and PC room in JS center.

Questions and answers are as follows.

<u>From Mr. Nhan</u>

Q: Do you send a lecturer to overseas for international cooperation?

A: One employee was sent to MOC in Vietnam as JICA expert.

<u>From Ms. Mai</u>

Q1: How local government officer apply for the training course? Does the local government decide trainees and send them? Or do they apply by themselves?

A1: Local government decide trainees. I heard that there are 2 cases. One is that a boss designates

them, the other is that subordinate requests it.

Q2: Who covers training cost?
A2: Each local government does.

Q3: Does the qualification expire?
A3: No.

From Ms. An
Q1: I would like to know more about the course fee. What kind of cost do the trainees pay for?
A1: They pay for lectures, accommodation and meals.

Q2: Do the trainees who are not sent by local government pay course fee by themselves?
A2: They cannot participate the training course unless they are sent by local government.

From Mr. Phung
Q: How long are the shortest and longest training course?
A: The shortest one is one day, and the longest one is 3 weeks. It used to be 4 months training before, but it abolished because it is difficult to prepare lecturers for such a long term.

From Mr. Hue
Q1: How does JS center invite trainees? Do you visit local government office?
A1: We send invitation letter now. I heard that JS center visited local government office since the training course was not well-known.

Q2: Can university students participate the training course?
A2: No.

From Mr. Dat
Q1: About qualification examinations, is there evaluation standard? Is it based non the law or JS standard?
A1: It is evaluated based on the JS original standard and opinion from university professors.

Q2: Does the training for company provide a certification once the trainees complete the training course?
A2: There are 2 types; seminar and training course which gives a certification.

Q3: The required working period for the training course which gives a certification was shortened from 10 years to 5 years. Was the training period is shortened as well?

A3: It is 3 weeks. The training period of the training course which gives a certification is more than 2weeks.althouf it used to be 1 month before.

(2) Observing Facilities

Trainees observed facilities after the Q&A session.

Lecture about JS center

Display room

Lecture about JS center

Training room

PC room

Water quality laboratory

Dormitory

Bed room of dormitory

11. Presentation of Action Plan

Date: 14：40~16：30 18th January, 2019

Venue: JICA Tokyo center SR404

Facilitator: Takeki Kajiura/ Nippon Koei, and others

Observers: Mr. Fujisawa/JICA Tokyo, Ms. Shimodaira/ JICA global environmental department, Mr. Hayashi/ JICA global environmental department, Mr. Ito/ MLIT sewerage department, Mr. Yamaganmi/ MLIT sewerage department

Presentations of action plans were done by trainees. Facilitator was Mr. Kajiura.

Presentation of action plan was conducted separately by each content as below.

1) Items left an impression on you, Useful knowledge

2) Short term action plan

3) Long term action plan (5~10 years)

(1) Mr. Bui Hong Hue

1) Items left an impression on you, Useful knowledge

- Laboratory items are kept tidy and in order in JS training center.
- Shield method in Nagoya city and PTF in Kochi city (small area, energy saving)
- The knowledge of mechanical facility which Training Center of the Bureau of Sewerage in Tokyo Metropolitan has.
- Construction method of house connection

2) Short term action plan

- The facilities of CUWC should be relocated.
- Training for engineers should be improved.
- The evacuation route of dormitory should be well arranged. Bed should be relocated.

3) Long term action plan

- Establish sewerage training course in CNEE
- Install facilities and equipment for training course, and develop the capacity of trainers in order to make CUWC the best training center in Vietnam.
- Drainage system of new school building should be changed from combined sewer system to separate sewer system because of the odor. Also, drainage of the campus also should be changed to separate system as well. It will take more than 5 years (until 2023).
- I would like to construct small-scale sewage treatment plant inside the campus.

【Q&A】

(Fujisawa)The presentation was from the viewpoint of management side. Do you propose the plan to

CUWC?

⇒ The national goal is to treat wastewater all over the country. Therefore, CUWC should be the best training facility for sewerage section.

(Ito) How about using the odor problem as study material. It is nice idea to construct a sewage treatment plant.

⇒ First, we are going to install lid to street drain.

(2) Mr. Pham Thanh Dat

1) Items left an impression on you, Useful knowledge

- I was impressed with Japanese character, awareness and attitude. These are the key points of success.
- House connection for sewerage project is implemented systematically. Development of legal system and explanation to residents are well done.
- Training center of Bureau of Sewerage Tokyo Metropolitan Government is working well in Planning, Preparation and Implementation. The contents of lecture are becoming better.

2) Short term action plan

- Educational training and awareness raising for officers
- Relocate facilities and equipment based on the 5S.
- Optimize the curriculum of training
- Establish the subject of sewerage system design in the training course.

3) Long term action plan

- Educate teachers and relocate facilities and equipment according to the school guideline.
- CNEE and private company will corporate to open the practical training course. Contents of Training course should be better (2019~2023)
- I will develop VSC, make human resources and facilities better, and make it the best training center for sewerage. VSC will open training course for engineering consultants and become financially independent. (2019~2029)

【Q&A】

(Shimodaira) You stated that practical training course will be founded in the corroboration with private company. Is there a particular company you think of at this moment?

⇒I would like to do it with facility manufacture for example Meta Water. It is under going for water supply training course. I would like to improve the sewerage training course as well.

(3) Ms. Vu Thi Hoai An

1) Items left an impression on you, Useful knowledge

- Sewerage database system is opened to everybody including residents
- The constructions of house connections are implemented based on the same standard in Takasaki city and Otsu city
- Residents have awareness for environmental conservation

2) Short term action plan

- Establish training course for sewerage
- Education for house connection
- As VSC, a seminar of database system will be hold in July. It will be also held in CUWC in November

3) Long term action plan

- Conduct sewerage training course at least once in a month base on the school policy,

【Q&A】

(Fujisawa) You have visited Otsu city and Kochi city. Do you have any ideas that you would like to apply to your country?

⇒It is important to raise the house connection ratio regardless of their scale. Even if STP is constructed, sewer does not flow into it. There is no law of sewage. (Hue)

⇒The scale of STP differs depending on the population. The water quality of sewer of Vietnam is the same with that of Japan. It is important that treatment capacity increases as the population increase. (An)

(Hayashi) How do you think about JS training center? I think it is the goal of CUWC.

⇒ Their planning and implementation method can be applied to CUWC. However, training fee cannot be covered by local government. The training course in Vietnam is for employees of private company. Therefore, there is no subsidy from the government. Sewerage management will be privatized in Vietnam, so it is difficult to make use of subsidy. (Hue)

(4) Mr. Chau Ngo Anh Nhan

1) Items left an impression on you, Useful knowledge

- Database system. It is useful for not only operators but also residents and private companies. Khanh Hoa city is trying to install it.
- High ratio of house connection. Khanh Hoa city does not force residents to implement house connection. The method of raising the ratio and the construction company designation system are useful reference.
- Pipe renewal method is great. In Khanh Hoa city, there are old pipes which are installed more than 50 years ago, so inspection and renewal are needed.

2) Short term action plan

- TOR of sewerage database system will be implemented in March and April 2019. Consultant will be selected in May to start it in July.
- Project to raise the house connection ratio will be started in March 2019. The activity for the residents' awareness will be implemented.
- Report to the government about the outcome of this training course, and share it with colleague. (February 2019)

3) Long term action plan

- Expand database system and make it completed in 2020. Create its rules of use and management in 2012.
- The house connection ratio will reach 90% by 2020. The connection ratio of private companies, factories and restaurants will reach 80%. The connection ratio of households will reach 30%.
- Inspection and renewal of existing sewer pipes will be implemented. I will propose a project by 2020, and find the donor. FS study will be conducted in 2022, roan agreement in 2023 and construction in 2025. I request JICA to support us.
- There is a relationship between a provincial city in Japan and Nah Trang city. An event related to Japan is hold in Nah Trang city.

【Q&A】

(Yamagami) Is the connection voluntary?

⇒ Decree 80 says the connection is a duty. It can be forced to private companies, but difficult to households.

(Yamagami) Is the content of PR activity water quality improvement? Any others?

⇒We have continuously conducted PR activity to convey the social benefit given by developing the sewerage system to residents. However, it does not go well. PR activity is implemented through neighborhood association in Japan, but it cannot be applied to Vietnam.

(5) Mr. Nguyen Thanh Phong

1) Items left an impression on you, Useful knowledge

- Develop sewerage infrastructure for the environmental conservation by making use of advanced science and technology
- Japan has many manufactures of sewer pipes and inlet for the house connection
- Construction administration of sewerage is very well in Japan. Construction in Japan has high reliability because it is implemented carefully. After the construction, its data is registered to the database to use for the management and repair.
- The training in Training Center of the Bureau of Sewerage in Tokyo Metropolitan is practical since it is composed with lecture and practical training. It will help trainees to get accustomed to the work at construction site.
- Obtained the knowledge of design, construction and registration to the database related to house connection.
- Technology needs products and parts to be implemented. It is great that Sekisui company produce various products.
- I am impressed that Metawater invented energy saving type wastewater treatment method, and they have been expanded to Vietnam.

2) Short term action plan

- Share the knowledge and experiment which I got in Japan with my colleague within this year.
- Write an article of this knowledge and experience, and contribute it to the magazine in Vietnam.

3) Long term action plan

- I will become a lecturer after Mr. Hue establish VSC in CUWC.
- I will update the information of this project and instruct to my colleagues and students.

【Q&A】

(Ito) What is the Vietnamese magazine? Is it periodical magazine?

⇒It is the magazine of water supply and sewerage which is issued by VWSA.

(Ito) I will appreciate if you spread the outcome of this training in Japan to your surroundings. Does the magazine accept the article from JICA Vietnam office?

⇒It is possible if you register as a cooperation member. Construction association covers the field of urban infrastructure. (Nga)

(Ito) Is it possible that Japanese JICA expert register?

⇒Yes, you can also contribute it in English. (Nga)

⇒ It is not allowed for construction newspaper issued by MOC. (Mai)

(6) Ms. Do Thi Hong Mai

1) Items left an impression on you, Useful knowledge

- I am impressed by Japanese infrastructure. MLIT covers the project of transportation.
- It is great that the house connection is regulated by law.
- The legal system of sewage is well developed. Residents have to deal with cross connection by themselves.
- Local government officer administrates the construction of house connection.

2) Short term action plan

- I will report to my department; human resources about the knowledge and experience I obtained in this training. I will tell my knowledge of Japanese sewerage development and O&M technology if there is an opportunity.
- Flooding happens in HCMC because of back water caused by tide. I would like to tell them the countermeasure of flood.
- Regulate the sewerage database system to the local government.
- Regulate the notification system for a beginning of service of sewerage facility.
- Make it possible for residents and company to access the database system
- Adopt OJT training to VSC. There are not so many practical trainings in Vietnam
- It is necessary to change in the way of thinking by government officers. For instance, PR activity for the house connection can be done in holidays. The examination of application for the house connection can be simpler.

3) Long term action plan

- I am an expert of law, and in charge of urban development. In the next, I will work on the law of water supply and sewage. I would like to regulate the house connection by the law. Decree 80 only regulates to submit the drawings of house connection. It is not clear if they really implement it.
- I would like to support VSC when it is founded by Mr. Hue.
- I would like to participate in the developing work of the law of sewerage.

【Q&A】

(Fujisawa) Takasaki city has good idea for reducing the house connection fee. Do you think that residents feel resistance to pay for the house connection fee?

⇒It is hard for them to cover the cost except the people in the urban area. It is difficult to implement the house connection in the old urban area. It will be far future in a farming village. (Mai)

⇒The house connection ratio is high in Dalat and Binh Duong. The expense of house connection was covered by the project by WB, therefore the ratio is about 90%. There is special subsidy for

poor citizens. (Nga)

⇒Nha Trang city does not borrow loans even if its interest is 0. In case of septic tank, excavation is required for the house connection, which means residents cannot live there during the construction. The middle-class residents can afford the construction fee. (Nhan)

(Shimodaira) Is there qualification system or preferential treatment for career up as incentive?

⇒ Establishment of VSC and qualification system should be included in the law of sewage. The advantage of the qualification will be notified. (Mai)

(Shimodaira) I would like you to consider the countermeasure for increasing the number of trainees in CUWC.