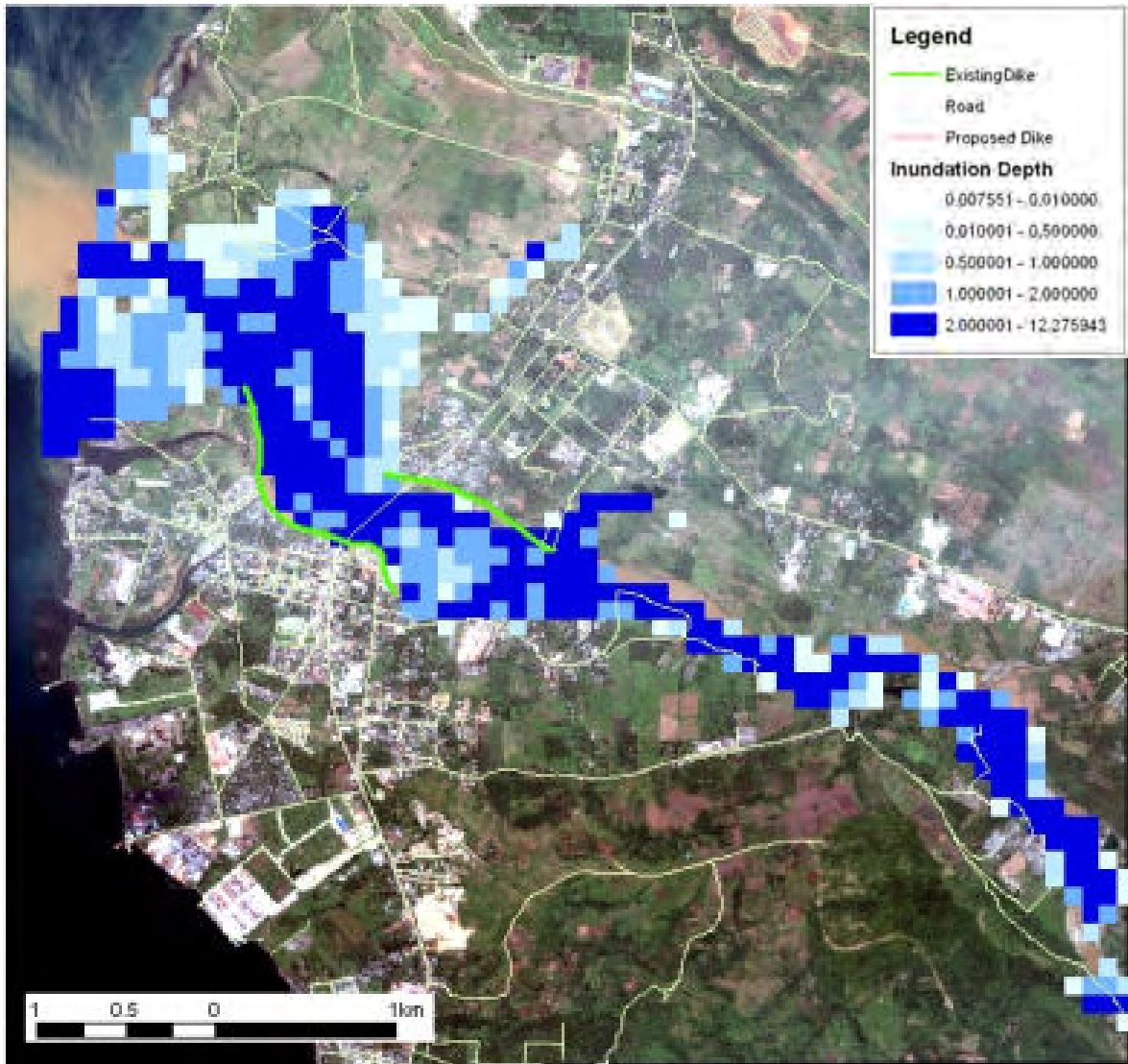


2 yr



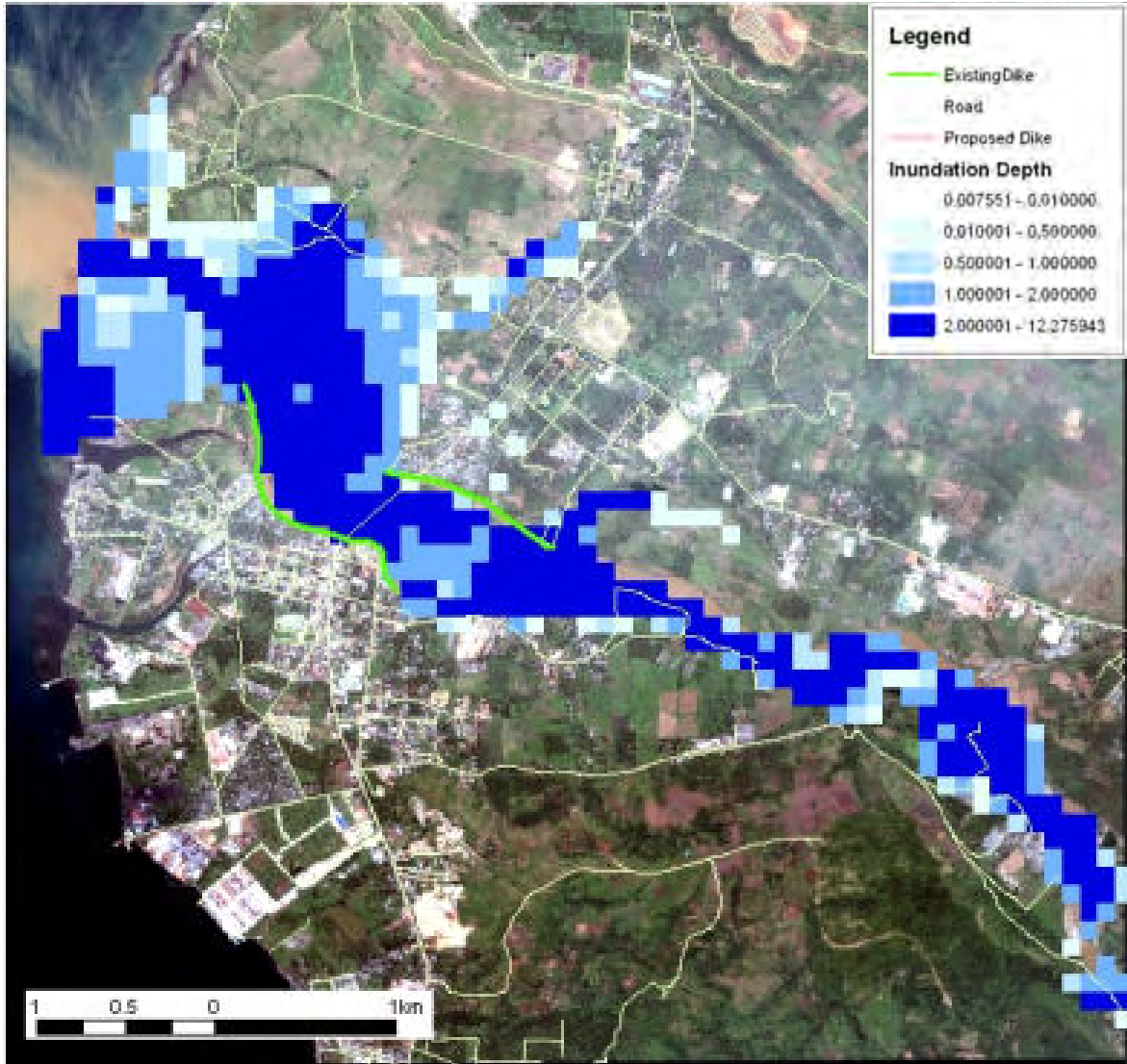
THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (1/6)

洪水氾濫計算結果
(Without Project)

5 yr



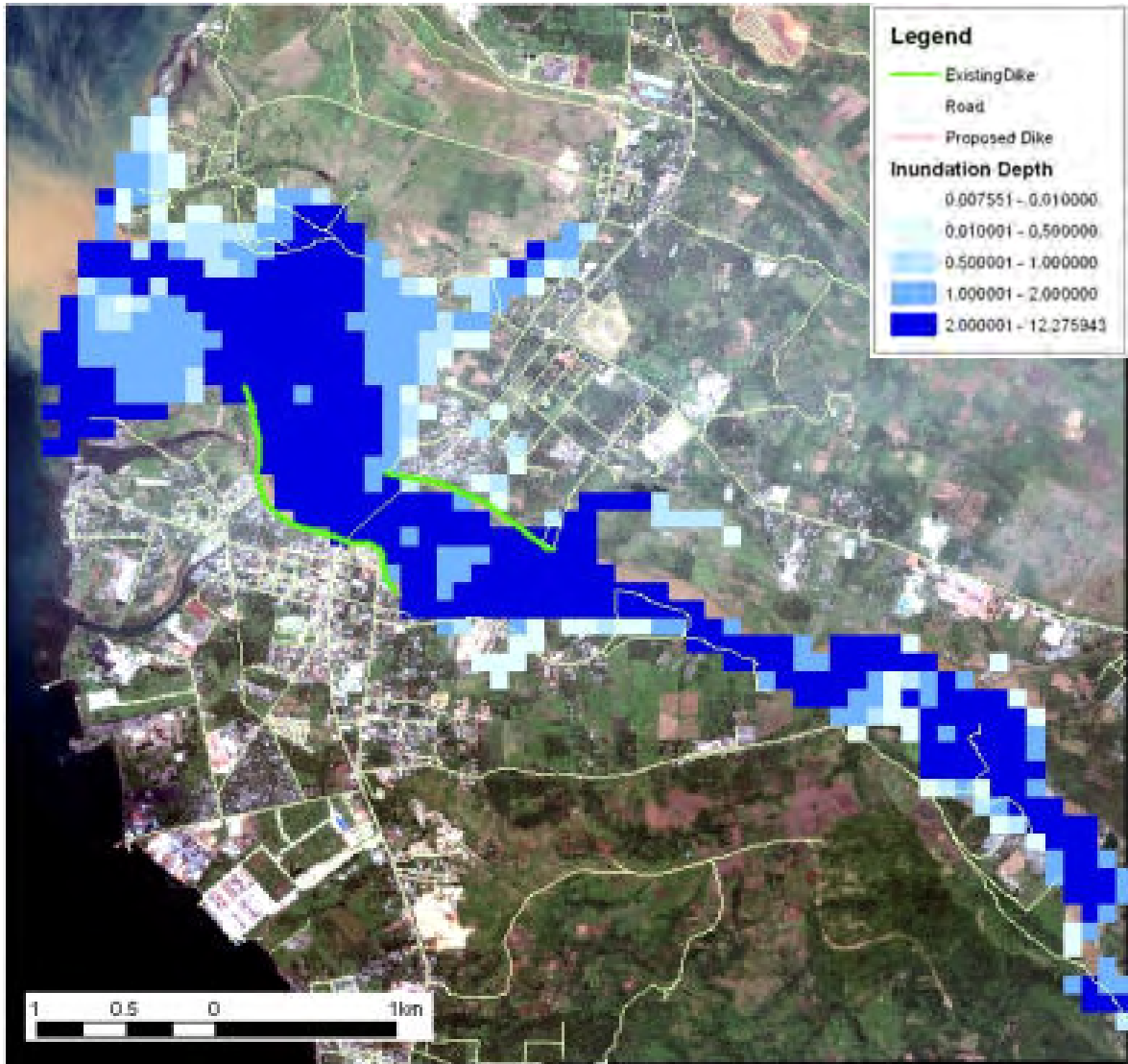
THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (2/6)

洪水氾濫計算結果
(Without Project)

10 yr



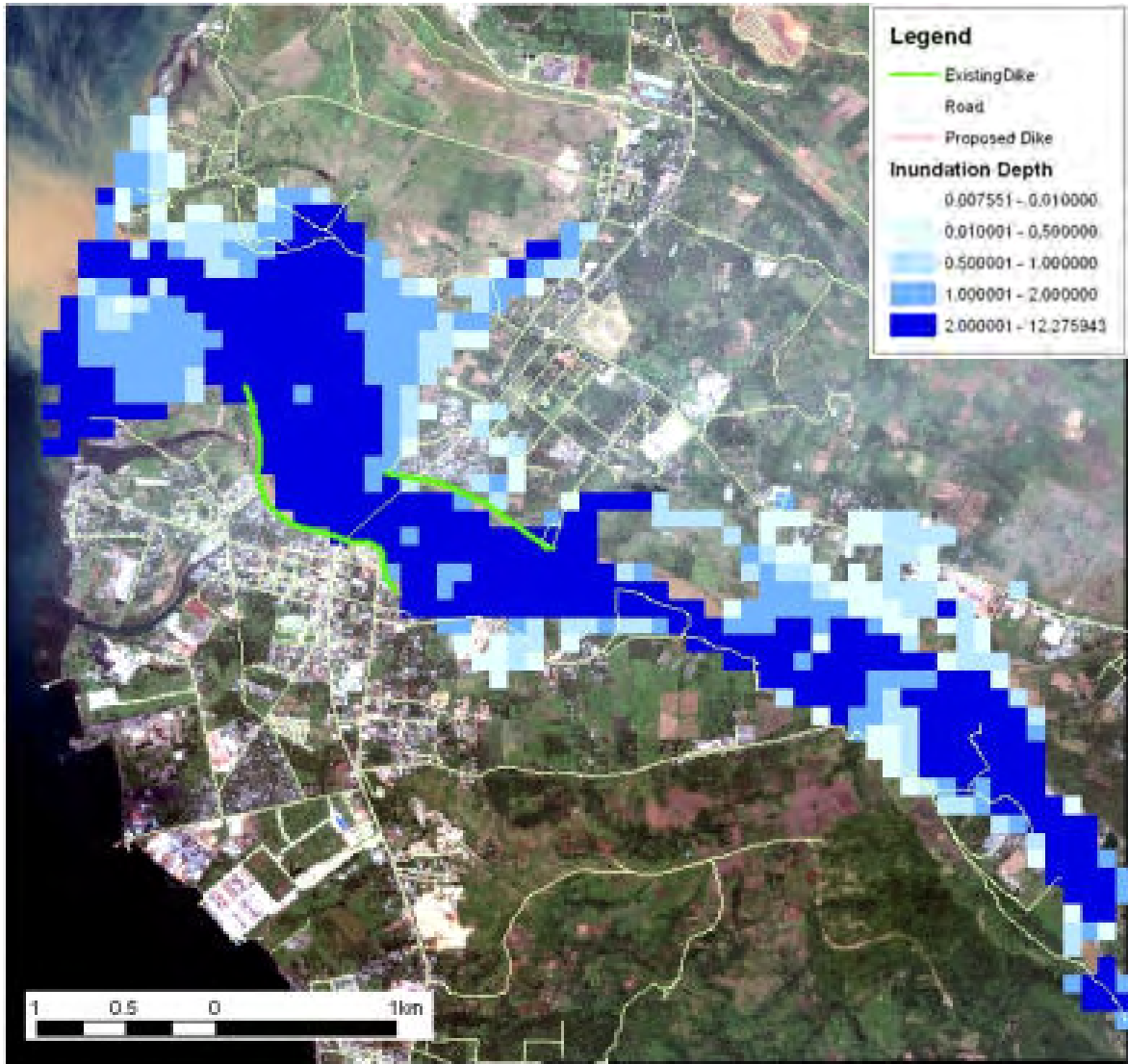
THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (3/6)

洪水氾濫計算結果
(Without Project)

25 yr



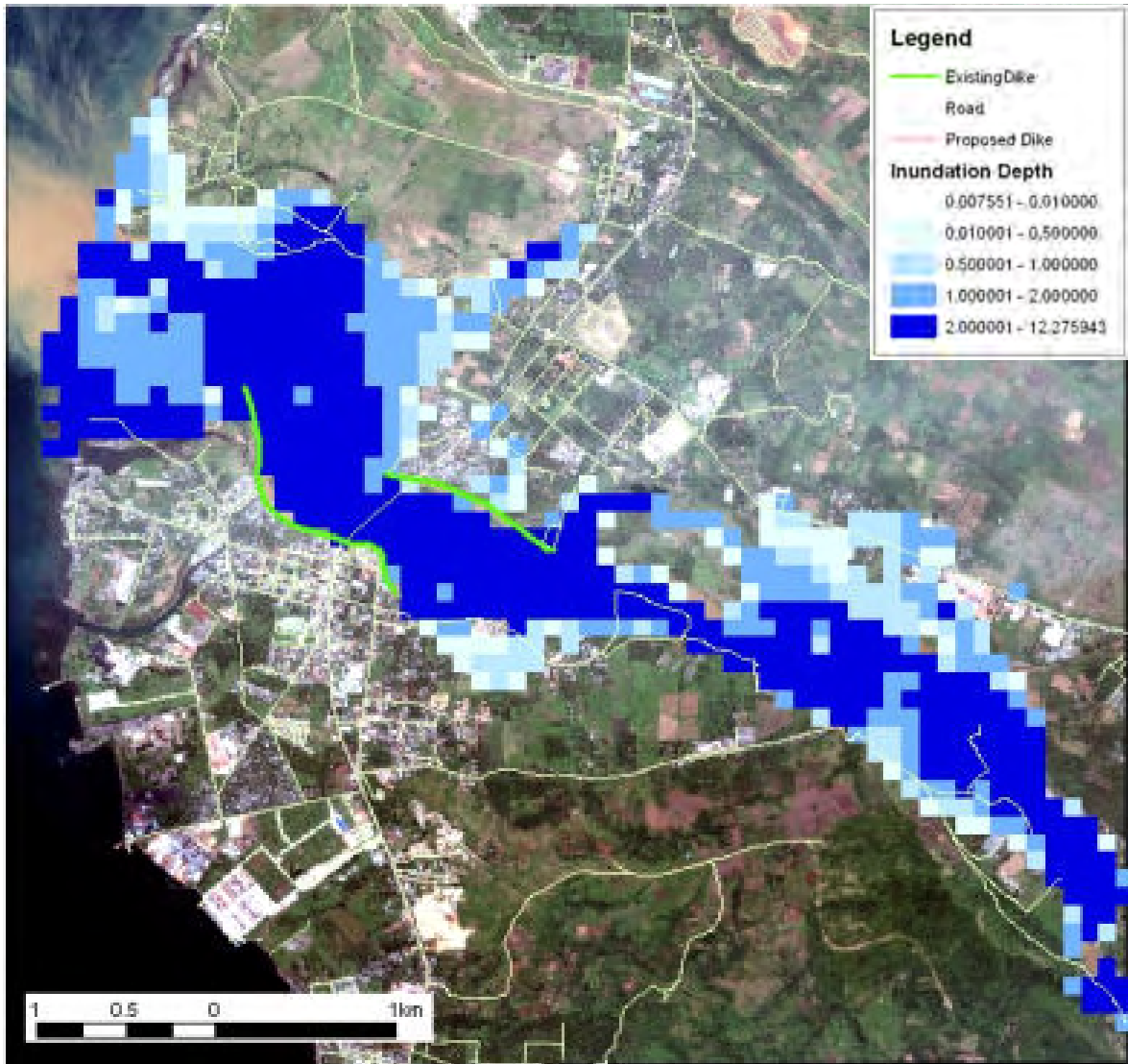
THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (4/6)

洪水氾濫計算結果
(Without Project)

50 yr



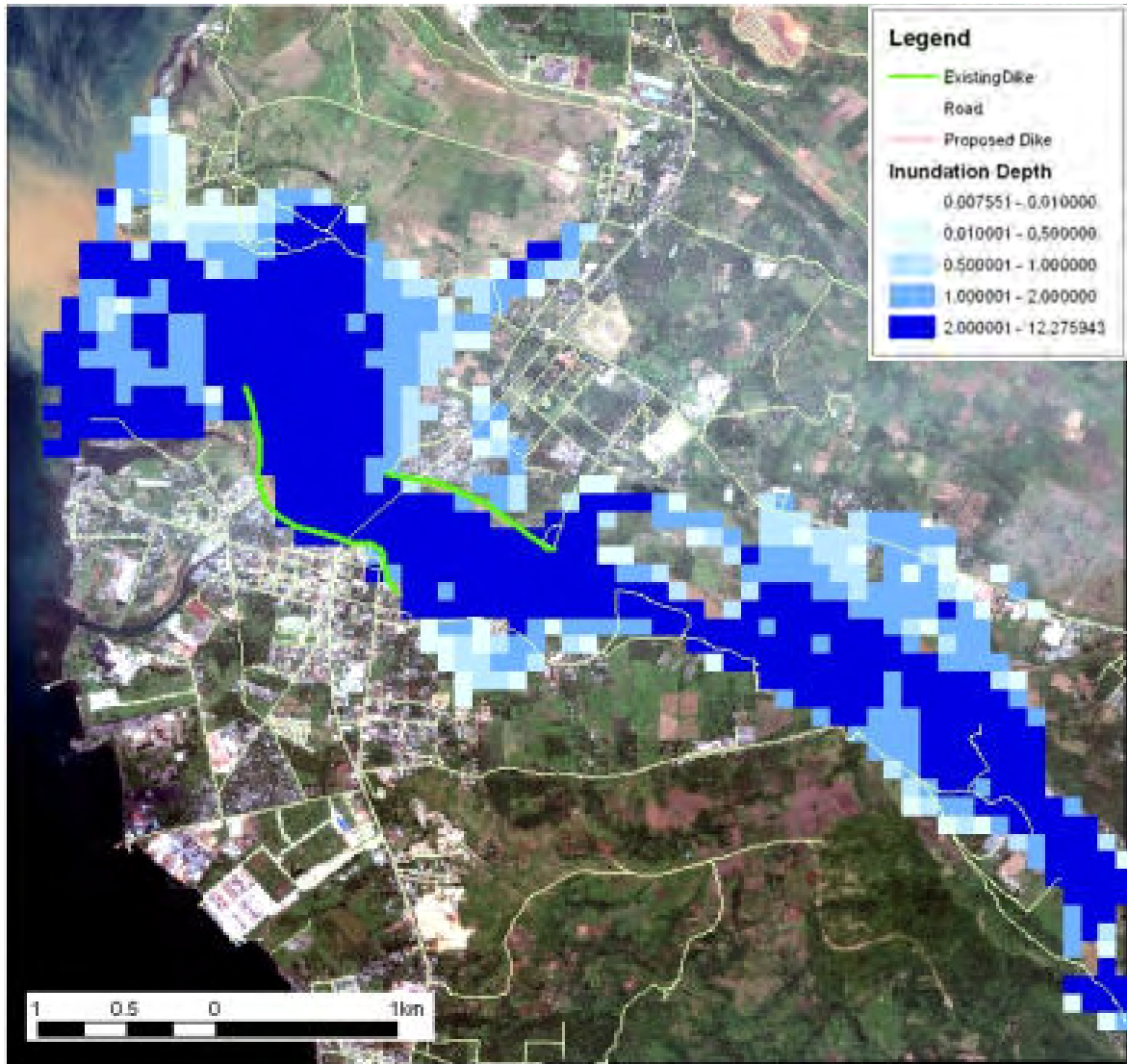
THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (5/6)

洪水氾濫計算結果
(Without Project)

100 yr

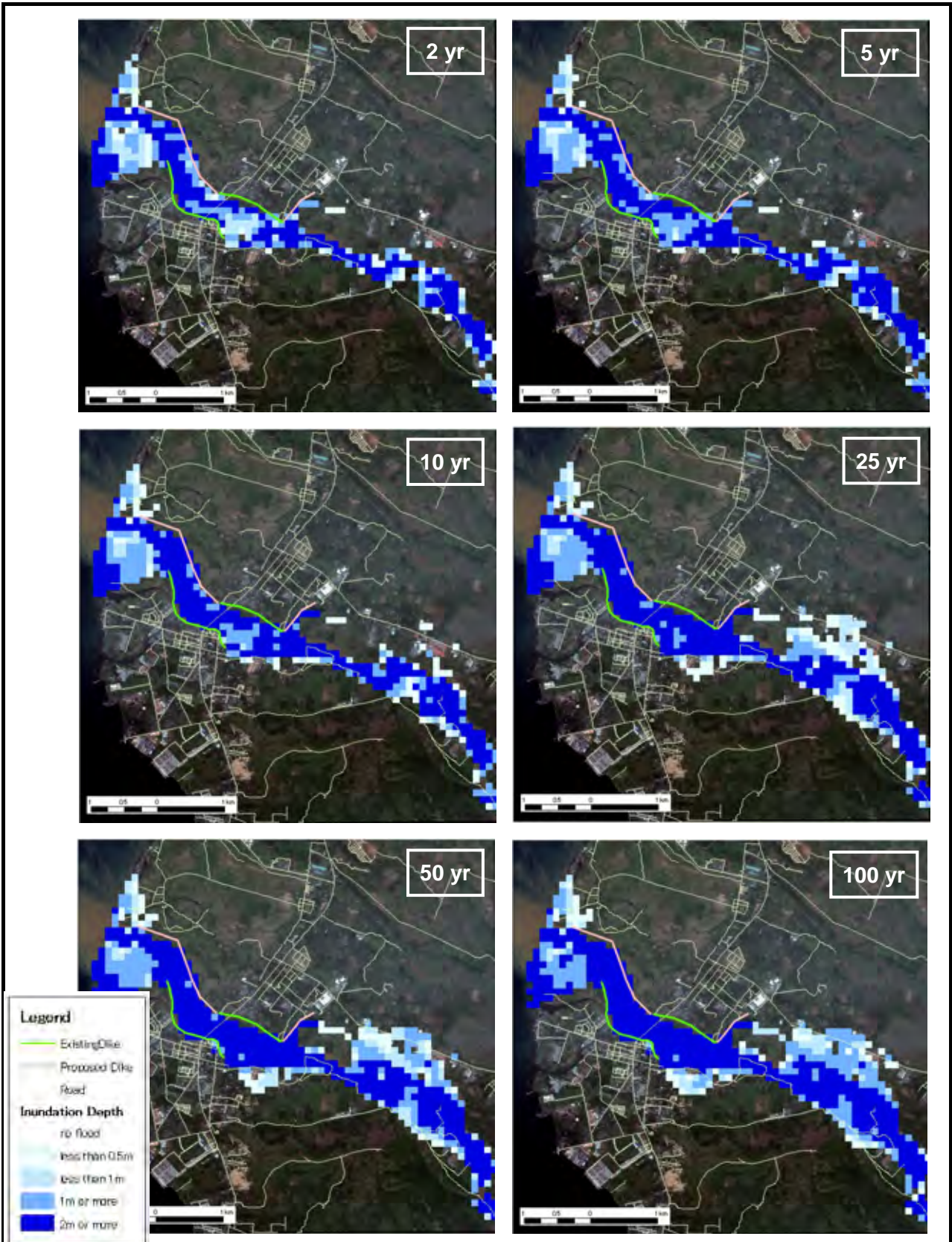


THE PREPARATORY STUDY FOR
SECTOR LOAN ON
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.4 (6/6)

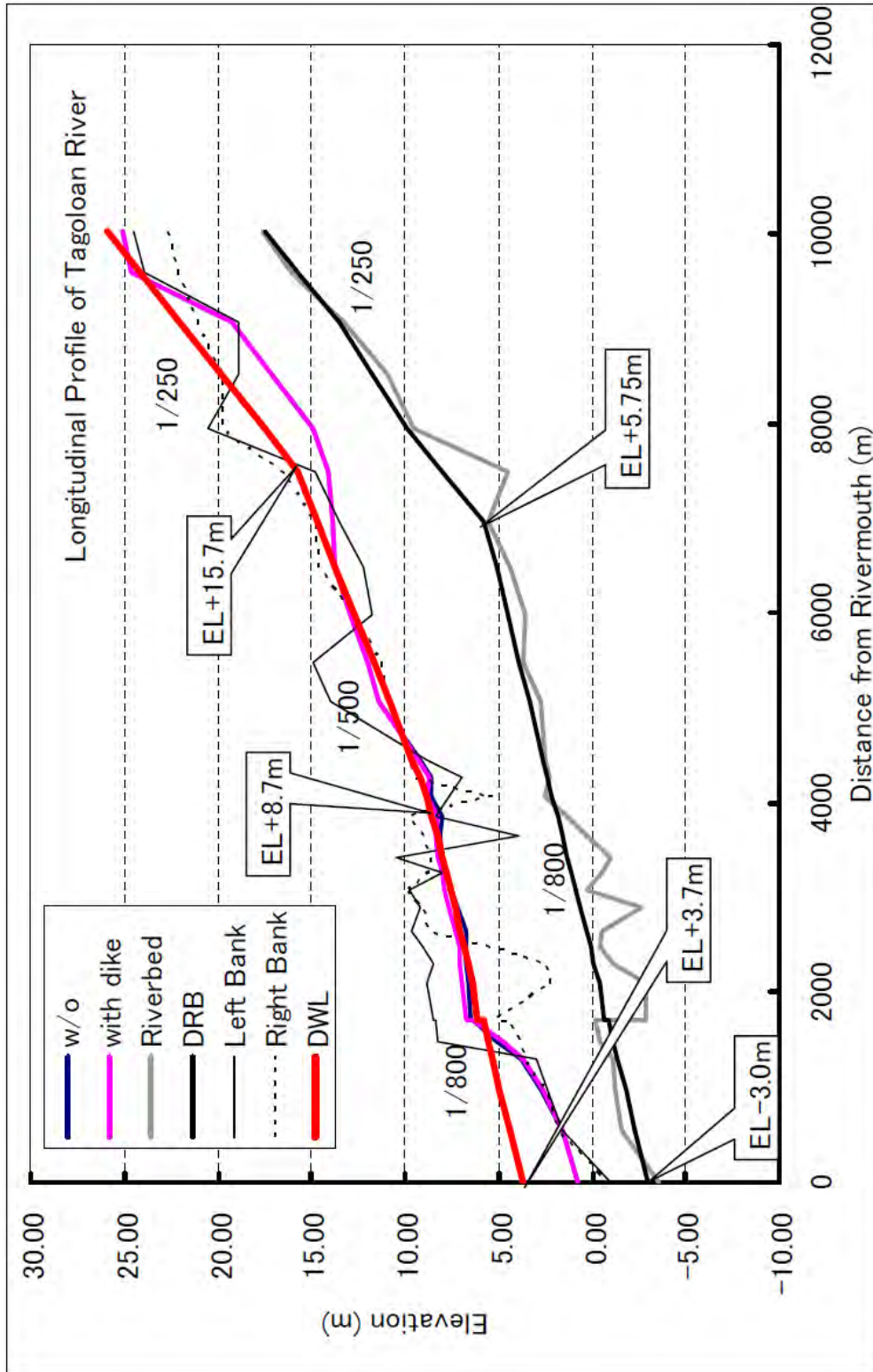
洪水氾濫計算結果
(Without Project)



THE PREPARATORY STUDY FOR
 SECTOR LOAN FOR
 DISASTER RISK MANAGEMENT
 CTI Engineering International Co., Ltd.
 Nippon Koei Co., Ltd

図 7.5

洪水氾濫計算結果
 (With Alt-T2)

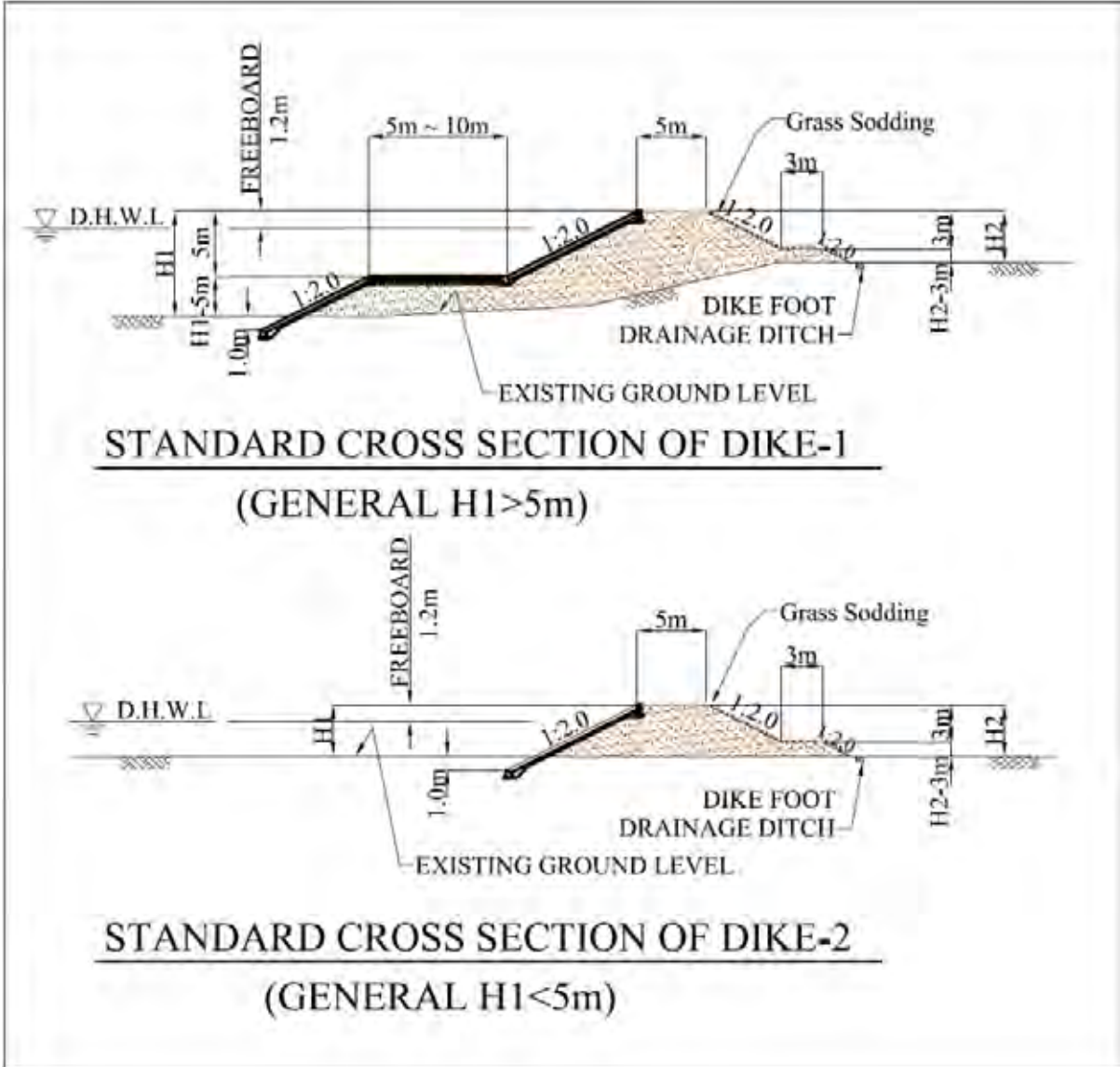


THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.6

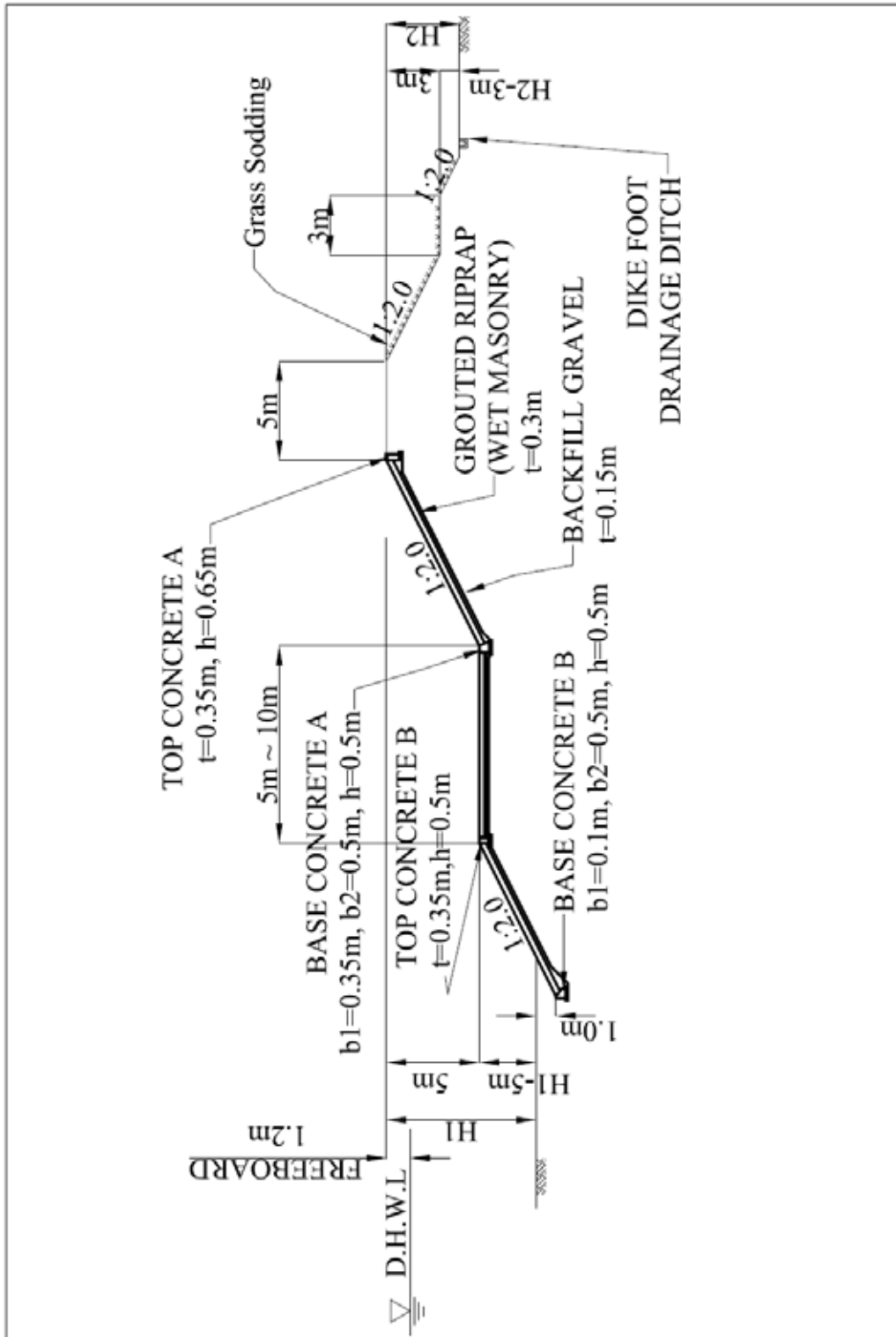
Tagoloan 川治水計画
(縦断面図および計画高水位)



THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.7
Tagoloan 川治水対策で提案する
河川堤防の標準断面図

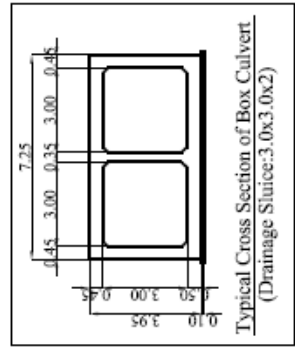
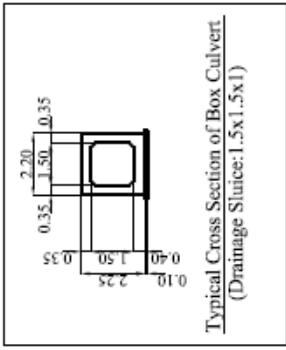
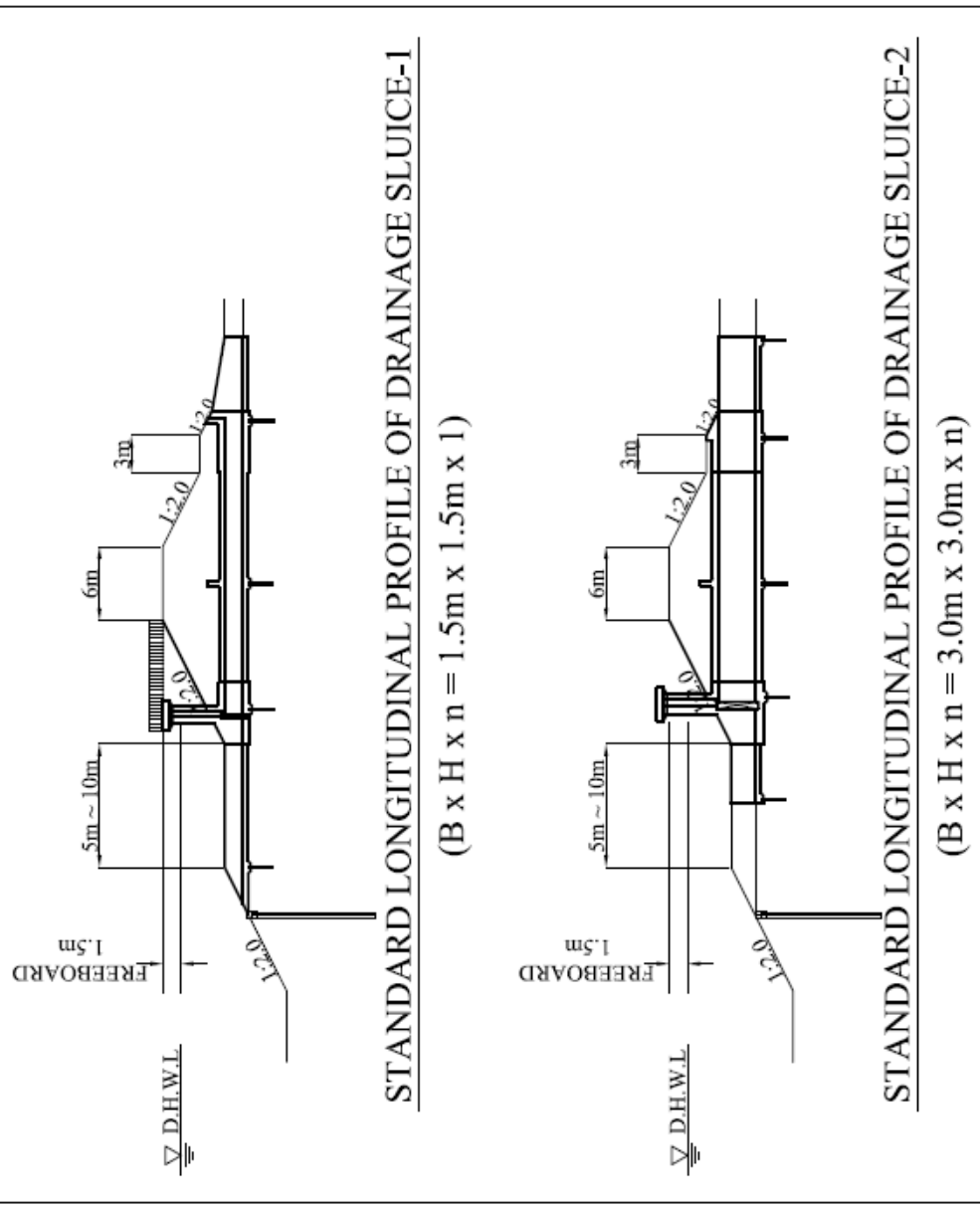


THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

Figure 7.8

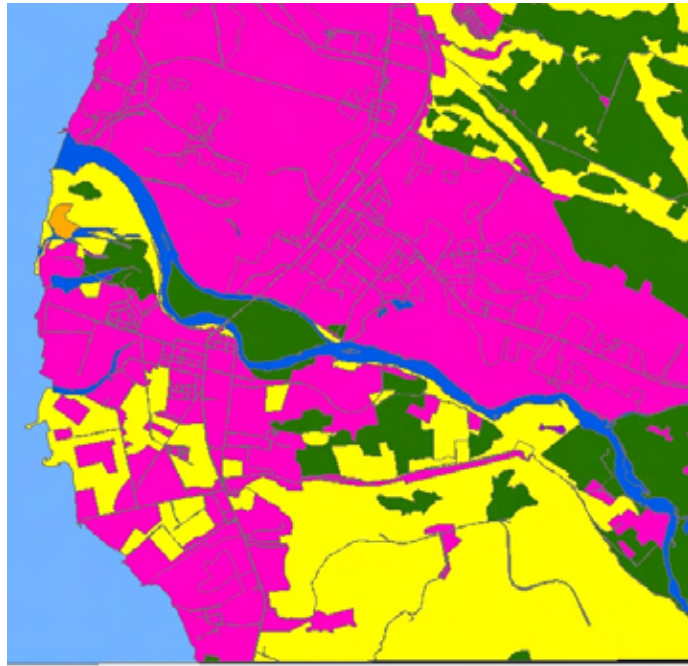
Tagoloan 川治水対策で提案する
護岸の標準断面図



THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.9
Tagoloan 治水対策での
排水樋門の標準図



Future Land Use Condition (Newly Developed Area: 8.8km²)



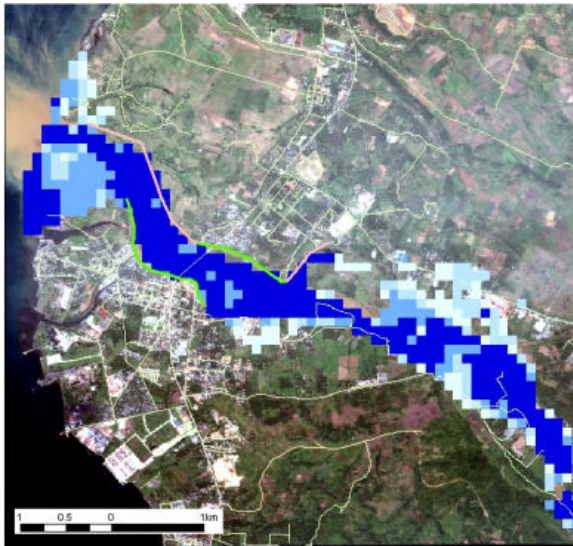
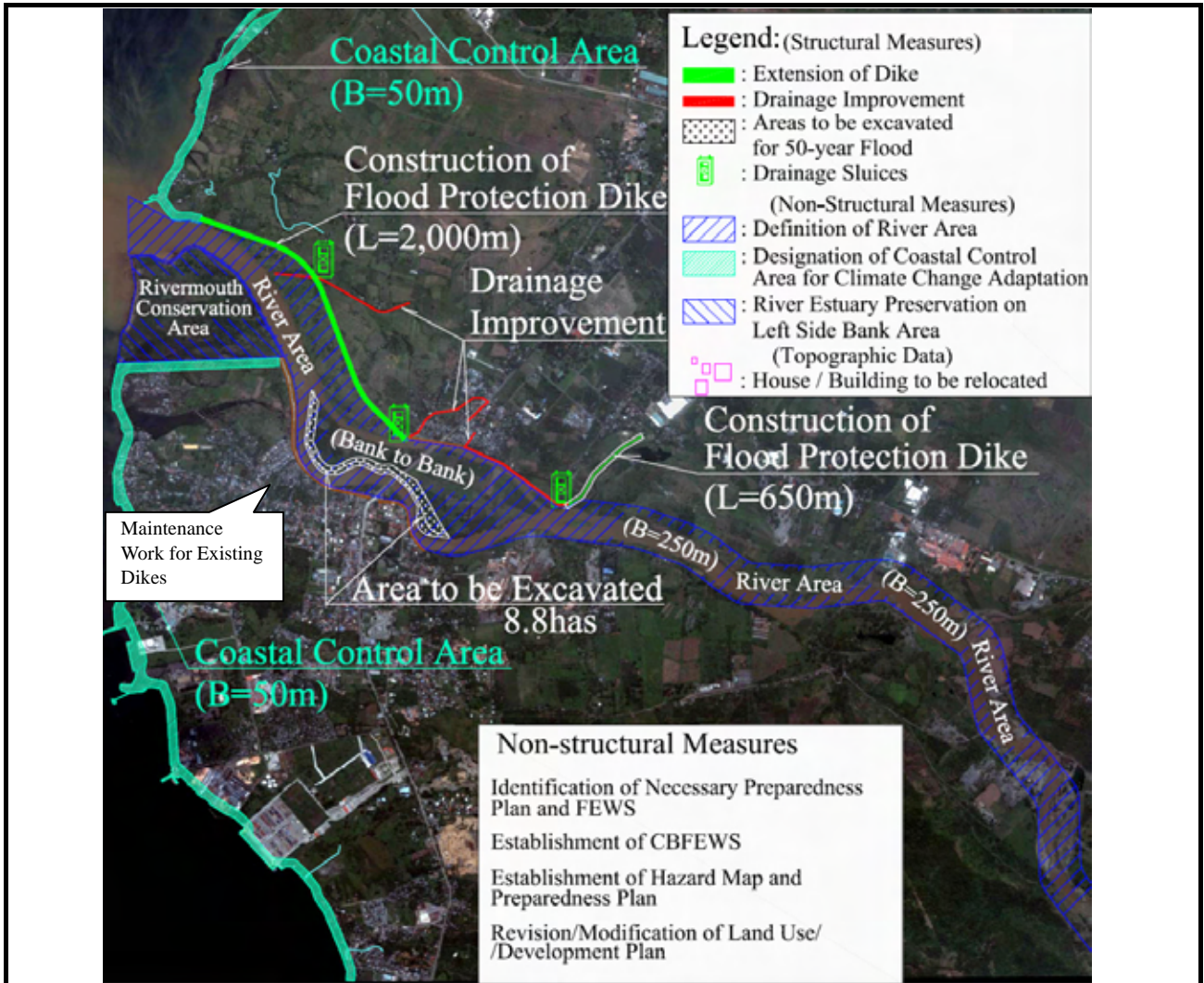
Expected
Diaposal
Site



Existing Land Use Condition with Expected Disposal Site for Surplus Soils

THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT
CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 7.11
Tagoloan 川治水対策の
余剰土砂の土捨て場候補地



Flood Hazard map



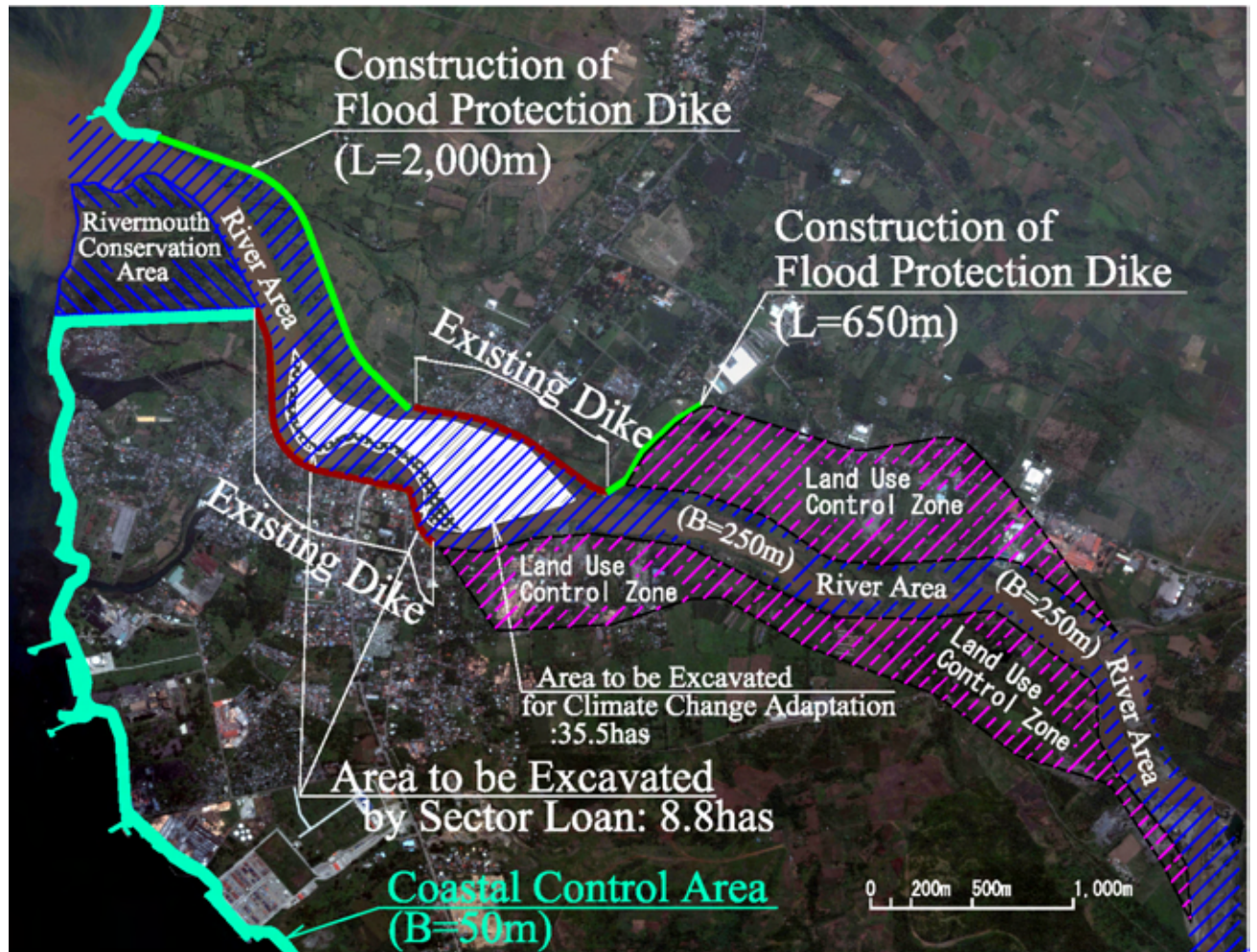
Preparedness Plan and FEWS

THE PREPARATORY STUDY FOR
SECTOR LOAN FOR
DISASTER RISK MANAGEMENT

CTI Engineering International Co., Ltd.
Nippon Koei Co., Ltd

図 8.1

Tagoloan 川流域の
提案する非構造物対策活動



THE PREPARATORY STUDY FOR
 SECTOR LOAN FOR
 DISASTER RISK MANAGEMENT
 CTI Engineering International Co., Ltd.
 Nippon Koei Co., Ltd

図 10.1
 Tagoloan 治水計画における
 気候変動適応策のまとめ

ANNEX

ANNEX PIIC 9-1

BIOLOGICAL SURVEY IN TAGOLOAN RIVER

(1) Survey methodology

The survey was conducted based on 1) the eye-checking on the habitats/signs and 2) interview to the local residents.

(2) Collected data

(a) Flora

Table 1 lists down the vegetation found in the area.

The table shows that vegetation in the area is made up mostly of small trees and shrubs such as the Ligas (*Semecarpus cuneiformis*), Hamindang (*Macaranga bicolor*), and others. Shrubs are represented by Sapinit (*Lantana camara*) and Kaliantan (*Leea philippinensis*).

Although there are species identified as medium to large trees, growth is stunted and restricted due to the human activities and other source of stressful activities in the area. The stunted growth may also be attributed to thin topsoil due to erosion. Such trees are the Mala-ipil (*Azelia barneensis*), Binuang (*Octomeles sumatrana*), and Lingo-lingo (*Vitioipremna philippinensis*).

Since harsh environmental conditions prevail in the area, pioneer species are also present. These usually belong to the family Moraceae and Euphorbiaceae. They are represented by the species Antipolo (*Artocarpus blancoi*) and the Hamindang (*Macaranga bicolor*), respectively.

Palms are also present, dominant of which is the coconut (*Cocos nucifera*). Takipan (*Caryota rumphiana*) was also seen.

Vines are abundant also. Philodendrons and Malakamias (*Ailanthus triphysia*) were seen twining among the shrubs and small trees. Grass is ever present.

Table 1 Collected Species in the Project Site (Flora)

Family	Scientific Name	Common Name	Ecological Status	Ecological and Economic Importance
Anacardiaceae	<i>Buchanania aborescens</i>	Balainghasa	Tree; rare/depleted/Endemic	Light construction material
	<i>Semecarpus cuneiformis</i>	Ligas	Tree; depleted/endemic	Fruites edible; medicinal value
Apocynaceae	<i>Ervatamia pandacaqui</i>	Pandakaki	Tree; common/endemic	Medicinal value, ecological balance
Araceae	<i>Philodendron erubescens</i>	Golden Philidendron	Vine; common	Ornamental
Araliaceae	<i>Scheffera odorata</i>	Five fingers	Woody vine; endemic	Ornamental
Ceasalpiniaceae	<i>Azelia barneensis</i>	Mala-ipil	Tree; uncommon/endemic	Light construction
Combretaceae	<i>Terminalia foetidissima</i>	Talisai gubat	Tree; common/Indigenous	Shade tree, ornamental, edible fruit
Cyatheaceae	<i>Cyathea sp.</i>	Fern	Common	ornamental
Cycadaceae	<i>Cycas rumphii</i>	Pitogo	Cycad;	Ornamental

Family	Scientific Name	Common Name	Ecological Status	Ecological and Economic Importance
			common/exotic	
Datiaceae	<i>Octomeles sumatrans</i>	Binuang	Tree; common/endemic	Light construction; charcoal making
Euphorbiaceae	<i>Macaranga bicolor</i>	Hamindang	Tree; depleted/endemic	Wood can be used for fuel, medicinal value
Graminae	<i>Arundo donax</i>	Tambo	Grass; common	Handicrafts
	<i>Schizostachyum sp.</i>	Climbing bamboo	Bamboo; depleted	Ornamental purpose, ecological balance
Leeaceae	<i>Leea philippinensis</i>	Kaliantan	Shrub; endemic	biodiversity
Mimosaceae	<i>Leucaena diversifolia</i>	Ipil-ipil	Tree; common/Indigenous	Fuelwood; light construction material
Moraceae	<i>Artocarpus blancoi</i>	Antipolo	Tree; common/Indigenous	Light construction
Palmae	<i>Cocos nucifera</i>	Coconut	Palm; common/exotic	Multipurpose, medicinal value
	<i>Caryota rumphiana</i>	Takipan	Palm; endemic	ornamental
Polypodiaceae	<i>Nephrolepis sp.</i>	Fern	Fern; common	ornamental
Rhizophoraceae	<i>Carallia brachiata</i>	Bakauan gubat	Tree; depleted	Tanning, dyeing, fuelwood/charcoal
Sapotaceae	<i>Palaquium philippinense</i>	Malak-malak	Tree; endemic	Light construction, medicinal value
Verbenaceae	<i>Lantana camara</i>	Sapinit	Weed; common/exotic	Pesticidal; hedge plant, medicinal
	<i>Vitioipremna philippinensis</i>	Lingo-lingo	Tree; endemic	Heavy construction
Zingiberaceae	<i>Alpinia elegans</i>	Tagbak	Tree; indigenous	Ornamental

(b) Fauna

Table 2 is the list of wildlife species sighted along the different transect lines in the proposed project site.

The bird families represented in the area are Nectariniidae (sunbirds), Apodidae (swifts and swiftlets), Columbidae (pigeons), Pycnonotidae (bulbuls), Strigidae (owls), and Ploceidae (sparrows). Most of the bird species are endemic to the island. Exceptions are Himalayan swiftlets (*Collocalia brevirostris whiteheadi*) and jungle fowls (*Gallus gallus gallus*), which are resident species.

Mammalian species observed belong to families Muridae (rats) and Pteropidae (musky fruit bats). These species are endemic to the country.

Reptilian families observed to be represented are Gekkonidae (gekkos), Scincidae (skinks), and Pythonidae (pythons). Lastly, there is only one amphibian species (marine toads) which belong to family Bufonidae.

Palms, bamboos, "takipan", and ipil ipil are some of the vegetation observed along the transect line. The bird species observed along this transect is Philippine coucals (*Centropus viridis viridis*), Himalayan swiftlets (*Collocalia brevirostris whiteheadi*), gray swiftlets (*Collocalia vanikorensis amelis*), glossy swiftlets (*Collocalia esculenta marginata*), and jungle fowl (*Gallus gallus*) were noted.

Aside from birds, a rat (*Rattus tanezumi*) was seen feeding on the fruits of aratilis. Furthermore, musky fruit bats (*Ptenochirus jagorii*) were seen flying over the area.

The table below shows the different animals that are still present and inhabits the proposed project site.

Table 2 Collected Species in the Project Site (Fauna)

Scientific Names	Common Names	Local Names	Family
Birds			
<i>Aplonis panyensis panayensis</i>	Philippine glossy starling	kalansiang	Sturnidae
<i>Centropus viridis viridis</i>	Philippine coucal	sabukot	Cuculidae
<i>Collocalia brevirostris whiteheadi</i>	Himalayan swiftlet		Apodidae
<i>Collocalia esculenta marginata</i>	Glossy swiftlet		Apodidae
<i>Collocalia vanikorensis amelis</i>	gray swiftlet		Apodidae
<i>Cypsiurus parvus pallidior</i>	Palm swift		Apodidae
<i>Gallus gallus gallus</i>	jungle fowl	labuyo	Phasianidae
<i>Hypsipetes philippinus philippinus</i>	Philippine bulbul		Pycnonotidae
<i>Ninox philippensis centralis</i>	Philippine boobook owl		Strigidae
<i>Passer montanus malaccensis</i>	tree sparrow	maya	Ploceidae
<i>Phapitreron leucotis brevirostris</i>	white-eared brown fruit dove		Columbidae
<i>Pycnonotus goivier samarensis</i>	Yellow-vented bulbul	tagulolla	Pycnonotidae
<i>Rallina eurizonides eurizonoides</i>	Phil. banded crane	tikling	Rallidae
<i>Treron pompadora canescens</i>	Pompadour green pigeon		Columbidae
Mammals			
<i>Ptenochirus jagorii</i>	musky fruit bat	kwaknit	Pteropidae
<i>Rattus tanezumi</i>	ricefield rat	dagang bukid	Muridae
Reptiles			
<i>Gecko gekko</i>	Tockay gekko	tuko	Gekkonidae
<i>Mabuya multifasciata</i>	common brown skink	bubuli	Scincidae
<i>Python reticulatus</i>	reticulated python	sawa	Boidae/ Pythonidae
Amphibians			
<i>Bufo marinus</i>	marine toad	palaka	Bufonidae

There are only a few species found in the area. A probable reason for this is the on-going quarrying activities as well as the presence of Industrial Estate (Phividec). These could have caused the wildlife in the area to move out and look for other food sources and suitable habitat.

Interviews with the residents (ethnobiological survey) indicated the existence of several species of birds not sighted nor heard. These include Philippine boobook owl (*Ninox philippensis centralis*) and pompadour green pigeon (*Treron pompadora*). In addition, pythons and other species of snakes reportedly inhabit the area.

ANNEX PIIC_9-2

WATER QUALITY ANALYSIS (TAGOLOAN)

(1) Sampling points

The sampling points are shown below.



Figure 1 **Sampling sites**

(2) Collected data

The summary of the data is shown as below.

Table 1 Summary of Sampling Data (heavy metals)

(Unit: ppm)

Analysis	Sample 1	Sample 2	Class C waters	Method detection Limit
Total mercury	<0.0001	<0.0001	0.002	0.0001
Total Arsenic	<0.02	<0.02	0.05	0.02
Total Cadmium	<0.002	<0.002	0.01	0.01
Total Chromium	<0.005	<0.005	0.05 (hexavalent)	0.005
Total Lead	<0.01	<0.01	0.05	0.01
Total Cyanide	<0.01	<0.01	0.05	0.01

The sampling analysis data sheets are shown below.

Results of Analyses

CRL-SN-09-1990
Page 2 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management - Ilog-Hilabangan River Basin

Date Sampled : 28-Jul-09
Date Received : 30-Jul-09
Matrix, Units : Water, mg/L
Analysts : TPS / JBC

Tagoloan ST-1 water
(Vz)

Lab. No. : 25078-14
Sample I.D. : TAG ST 1 H₂O

Analyses	Dates of Analyses	Results as received	MDL	DLR
SS - Cold Vapor (Total Mercury)	08/06/09	< 0.0001	0.0001	0.0001
Colorimetry - SDDC (Total Arsenic)	08/07/09	< 0.02	0.02	0.02
Flame AAS (Total Cadmium)	08/04/09	< 0.002	0.002	0.002
Flame AAS (Total Chromium)	08/04/09	< 0.005	0.005	0.005
Flame AAS (Total Lead)	08/04/09	< 0.01	0.01	0.01

MDL = Method Detection Limits

DLR = Detection Limits for Reporting (MDL x Dilution Factor)

References: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.
Test Methods for Evaluating Solid Wastes, Vol 1A, USEPA, Third Edition
Varian / Perkin Elmer Analytical Methods, Flame Atomic Absorption Spectrophotometry

Reviewed By: Chas C. Arroyo
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Date: 8/19/09

Approved By: Maria Carmela O. Tapule
Maria Carmela O. Tapule
Laboratory Director
PRC License No.: 7663

Date: 8/19/09

This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purpose without authorization is prohibited. This analytical report is Not Valid without the official dry seal of CRL Environmental Corporation.



**CRL Environmental
Corporation**

* Sales Office: Unit 609 Cityland 10 Tower 1 * 6815 H.V. dela Costa, Ayala Ave., North * Makati City, Philippines 1226
Tel: (632) 840-4071 ; (632) 817-3307 * Fax: (632) 816-0329 * E-mail: cri@berlabs.com * http://www.crlabs.com
* Laboratory Bldg. 2, Bernhaphil Compound 1, Bernhaphil Inc. Industrial Park
Jose Abad Santos Ave., CFZ Clarkfield Pampanga, Philippines
Tel.: (6345) 599-3943 * (6345) 499-6529 * (632) 299-5826 * Fax (6345) 599-3963

SEP. 28 2009 06:07PM P4

FRX NO.: 72749558

FROM: CESM

Result of Analysis

CRL-SN-09-1990
Page 3 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management - Ilog-Hilabangan River Basin

Date Sampled : 28-Jul-09
Date Received : 30-Jul-09
Date Analyzed : 04-Aug-09
Matrix, Unit : Water, mg/L
Analyst : ESG

*Tagoloan ST-1 water
(1/2)*

Lab. No. : 25078-15
Sample I.D. : TAG ST 1 H₂O CN

Analysis	Result, as received	MDL	DLR
Disfillation - ISE (Total Cyanide)	< 0.01	0.01	0.01

MDL = Method Detection Limit

DLR = Detection Limit for Reporting (MDL x Dilution Factor)

Reference: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.

Reviewed By: *Chas C. Arroyo*
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Date: *8/17/09*

Approved By: *María Carmela O. Capule*
María Carmela O. Capule
Laboratory Director
PRC License No.: 7663

Date: *8/17/09*

This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purpose without authorization is prohibited. This analytical report is Not Valid without the official dry seal of CRL Environmental Corporation.



**CRL Environmental
Corporation**

■ Sales Office: Unit 609 Cityland 10 Tower 1 * 6815 (1.V. dela Costa, Ayala Ave., North * Makati City, Philippines 1226
Tel: (632) 840-4071 ; (632) 817-5307 * Fax: (632) 816-0329 * E-mail: crl@crlilabs.com * <http://www.crlilabs.com>
■ Laboratory: Bldg. 2, Berthaphil Compound 1, Berthaphil Inc. Industrial Park
Jose Abad Santos Ave., CFZ Clarkfield Pampanga, Philippines
Tel.: (6345) 599-3943 * (6345) 499-6520 * (632) 299-5826 * Fax (6345) 599-3963

PS 08PM:06 09 28 Sep.

FRAX NO.: 72749558

FROM: CESM

Results of Analyses

CRL-SN-09-1990
Page 5 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bettie Castro - Del Nero

Customer's Project : Disaster Risk Management - Ilog-Hilabangan River Basin

Date Sampled : 28-Jul-09
Date Received : 30-Jul-09
Matrix, Units : Water, mg/L
Analysts : TPS / JBC

*Tagoan ST-2 water
(1/2)*

Lab. No. : 25078-17
Sample I.D. : TAG ST 2 H₂O

Analyses	Dates of Analyses	Results, as received	MDL	DLR
AAS - Cold Vapor (Total Mercury)	08/06/09	< 0.0001	0.0001	0.0001
Colorimetry - SDDC (Total Arsenic)	08/07/09	< 0.02	0.02	0.02
Flame AAS (Total Cadmium)	08/04/09	< 0.002	0.002	0.002
Flame AAS (Total Chromium)	08/04/09	< 0.005	0.005	0.005
Flame AAS (Total Lead)	08/04/09	< 0.01	0.01	0.01

MDL = Method Detection Limits

DLR = Detection Limits for Reporting (MDL x Dilution Factor)

References: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition,
Test Methods for Evaluating Solid Wastes, Vol 1A, USEPA, Third Edition / 1988 Annual Book of ASTM Standards, Volume 11.01
Varian / Perkin Elmer Analytical Methods, Flame Atomic Absorption Spectrophotometry

Reviewed By: *Chas C. Arroyo*
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Date: *8/17/09*

Approved By: *Maria Carmela O. Sapule*
Maria Carmela O. Sapule
Laboratory Director
PRC License No.: 7663

Date: *8/17/09*

This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purpose without authorization is prohibited. This analytical report is Not Valid without the official dry seal of CRL Environmental Corporation.



**CRL Environmental
Corporation**

■ Sales Office: Unit 609 Cityland 10 Tower 1 * 6815 H.V. dela Costa, Ayala Ave., North * Makati City, Philippines 1226
Tel: (632) 840-4071 ; (632) 817-5307 * Fax: (632) 816-0329 * E-mail: ori@crlabs.com * <http://www.crlabs.com>
■ Laboratory: Bldg. 2, Berhaphil Compound 1, Berhaphil Inc. Industrial Park
Joso Abad Santos Ave., CFZ Clarkfield Pampanga, Philippines
Tel: (6345) 599-3943 * (6345) 499-6529 * (632) 299-5826 * Fax (6345) 599-3963

Sep. 28 2009 06:09PM P7

FAX NO.: 72249558

FROM: CESM

Result of Analysis

CRL-SN-09-1990
Page 6 of 6

Customer : Center for Environmental Studies and Management, Inc.
Address : Unit 206, UAG Building, Ortigas Ave., Greenhills, San Juan, Metro Manila
Attn. : Bethela Castro - Del Nero

Customer's Project : Disaster Risk Management - Ilog-Hilabangan River Basin

Date Sampled : 28-Jul-09
Date Received : 30-Jul-09
Date Analyzed : 04-Aug-09
Matrix, Unit : Water, mg/L
Analyst : ESG

*Tagoloan ST-2 water
(2/2)*

Lab. No. : 25078-18
Sample I.D. : TAG ST 2 H₂O CN

Analysis	Result, as received	MDL	DLR
Distillation - ISE (Total Cyanide)	< 0.01	0.01	0.01

MDL = Method Detection Limit

DLR = Detection Limit for Reporting (MDL x Dilution Factor)

Reference: Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 21st Edition.

Reviewed By: *Chas C. Arroyo*
Chas C. Arroyo
Laboratory Manager
PRC License No.: 6701

Date: *8/12/09*

Approved By: *Maria Carmela O. Capule*
Maria Carmela O. Capule
Laboratory Director
PRC License No.: 7663

Date: *8/12/09*

This report pertains only to the samples investigated and does not necessarily apply to other apparently identical or similar materials. This report is submitted for the exclusive use of the client to whom it is addressed. Any reproduction of this report or use of this Laboratory's name for advertising or publicity purpose without authorization is prohibited. This analytical report is Not Valid without the official dry seal of CRL Environmental Corporation.



CRL Environmental Corporation

■ Sales Office: Unit 609 Cityland 10 Tower 1 ♦ 6815 H.V. dela Costa, Ayala Ave., North ♦ Makati City, Philippines 1226
Tel: (632) 840-4071 ; (632) 817-5307 * Fax: (632) 816-0329 * E-mail: erl@crlilabs.com * <http://www.crlilabs.com>
■ Laboratory: Uldg. 2, Berthaphil Compound 1, Berthaphil Inc. Industrial Park
Jose Abad Santos Ave., C/PZ Clarkfield Pampanga, Philippines
Tel.: (6345) 599-3943 * (6345) 496-6520 * (632) 209-5820 * Fax (6345) 599-3963

Se.p. 28 2009 06:10PM P8

FAX NO.: 72749558

FROM: CESM

ANNEX PIIA_9-3

NOISE MEASUREMENT (TAGOLOAN)

(1) Sampling date/points

Conducted date: July 16, 2009

Sampling points: (Figure 1 Sampling sites)

- (1) At the dike near Bridge
- (2) At Pumping Station
- (3) At western part of dike

The noise sampling stations were positioned at the nearest residential community to determine the possible impact of noise during the construction period.

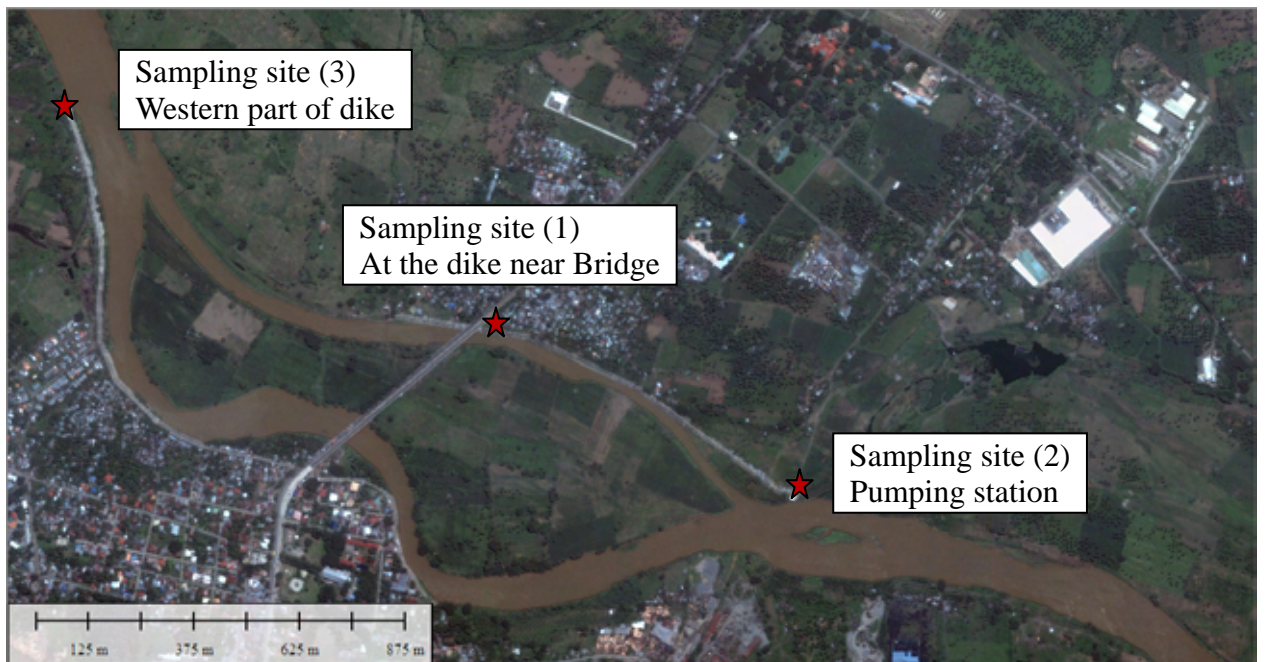


Figure 1 Sampling sites

(2) Measurement instrument

A precision type, digital sound level meter using the method prescribed in the implementing rules and regulations of PD 984. The instrument is also provided with an integral calibrator which allows the instrument to be calibrated to 94dB. The minimum and maximum of continuous readings were recorded in each station. The median values were then taken and compared with the DENR noise standards based on the 1978 Rules and Regulations of PD 984.

(3) Collected data

The measurement result is shown as below.

Table 1 Results of Noise Sampling

Station	Distance	Time	Min. (dBA)	Max. (dBA)	Median (dBA)	DENR Std. (dbA)	Category of Area	Remarks
At the dike near Bridge								
	10 meters planed dike	Morning (6:20am)	50	78.3	64.15	50	Class A	Exceeded
		Noon (11:30 am)	64	78.5	71.25	50	Class A	Exceeded
		Evening (6:50pm)	56	75	65.5	50	Class A	Exceeded
	15 meters from planed dike	Morning (6:40am)	48	75.4	61.7	55	Class A	Exceeded
		Afternoon (12:00 noon)	58	78	68	55	Class A	Exceeded
		Evening (7:20pm)	54	65	59.5	55	Class A	Exceeded
Pumping Station								
	10 meters from planed dike	Morning (8:10am)	48.2	55	51.6	55	Class A	within
		Afternoon (1:40pm)	43.8	58	50.9	55	Class A	within
		Evening (5:10pm)	45.2	59	52.1	55	Class A	within
	20 meters from planed dike	Morning (7:50am)	45.2	61	53.1	55	Class A	within
		Afternoon (2:00pm)	43.5	62	52.75	55	Class A	within
		Evening (5:20pm)	44.8	56	50.4	55	Class A	within
Western part of dike								
	10 meters from planed dike	Morning (8:40am)	44.3	55.5	49.6	65	Class A	within
		Afternoon (12:40pm)	43.2	54.6	59.4	70	Class A	within
		Evening (6:00pm)	42.6	48	55.9	60	Class A	within
	15 meters from planed dike	Morning (9:20am)	45.3	54.6	51.5	65	Class A	within
		Afternoon (1:20pm)	50.6	53.3	56.9	70	Class A	within
		Evening (6:20pm)	43.2	49	54.3	60	Class A	within

The noise standards may be considered as Class A since the area is primarily used for residential purposes. Thus, the results of the sound level measurement are compared to the daytime standard for Class A area.

The samples were made at the diked areas, the first near the bridge, the second at the northern dike near the pumping station and the third at the southern dike at westernmost portion. There were some exceedances in the noise parameters at the bridge because of the passing through of vehicles, especially trucks, in the area which are often noisy and without noise retardants. In the other sites, however, there are no roads that will allow the passing of vehicles near the area.

(4) Noise Standard

The country implements an Environmental Quality Standard for noise in general areas as outlined in Presidential Decree (PD) 984, or the Pollution Control Law of the Philippines. The noise standards specify the allowable level of noise based on category of area as outlined Table 2.

Table 2 Environmental Quality Standards for Noise in General Areas

Category of Area	Daytime	Morning & Evening	Nighttime
AA	50 dB	45 dB	40 dB
A	55 dB	50 dB	45 dB
B	65 dB	60 dB	55 dB
C	70 dB	65 dB	60 dB
D	75 dB	70 dB	65 dB

Source: Official Gazette, 1978 Implementing Rules and Regulations of P.D. 984.

Legend:

Category of Area is as follows:

- AA - a section or contiguous area which require quietness such as area within 100 meters from school sites, nursery schools, hospitals, and special home for the aged.
- A - a section or contiguous area primarily used for residential purposes.
- B - a section or contiguous area primarily used as commercial area.
- C - a section primarily reserved as a light industrial area.
- D - a section primarily reserved as a heavy industrial area.

Division of 24-hour period is as follows:

- Morning - 5:00 AM to 9:00 AM
- Daytime - 9:00 AM to 6:00 PM
- Evening - 6:00 PM to 10:00 PM
- Nighttime- 10:00 PM to 5:00 AM.

ANNEX PIIC_9-4

LAND-SUE IN MUNICIPALITY TAGOLOAN

Table 1 Land-use in Municipality Tagoloan

Land Use Type	Area (hectares)	% to Total
Built-up Areas (residential, institutional, commercial, open spaces)	1,035.65	13.05
Industrial areas	1,455.27	18.33
Agricultural lands		
Production	2,664.34	33.56
Protection	628.92	7.92
Forest lands		
Production	1,388.46	17.49
Protection	160.34	2.02
Agro-Industrial Areas	160.44	2.02
Utilities	7.43	0.09
Grasslands	391.25	4.93
Quarry Lands	45.81	0.58
Total	7,937.90	100.00

As one can see, a large percentage of Tagoloan has been zoned industrial. This is because of the presence of a large industrial estate owned by a government owned and controlled corporation, the Philippine Veterans Investment Development Corporation (PHIVIDEC).

Of the areas planted to crops, the following land uses are relevant;

Table 2 Crop-Wise Land use of agriculture Land in Municipality Tagoloan

Classification	Crop Area (hectares)				
	2003	2004	2005	2006	2007
Rice (Irrigated)	NA	89.00	35.00	30.00	30.00
Rice (Lowland /Rain-fed)	52.25	NA	NA	10.00	25.00
Rice (upland)	60.75	NA	10.00	5.00	NA
Corn	523.75	595.00	596.00	837.25	443.50
Coconut	NA	NA	450.00	NA	NA
Banana	5.00	11.00	73.50	81.00	86.00
Papaya	30.00	NA	NA	32.00	32.00
Mango	0.50	0.25	24.00	24.50	26.00
Peanut	0.50	0.50	NA	NA	NA
Vegetables	18.00	15.16	15.00	20.00	22.00
Root Crops	30.00	10.00	10.00	10.00	12.00
Cashew	6.00	NA	5.00	5.00	5.00
Total	726.75	720.91	1,218.50	1,054.75	681.50

(Note: "NA" means not available data)

As one may note, there is some variability in the area devoted to agriculture through the years. This municipality attributed to a series of factors, among them are:

- Reclassification of agricultural land to industrial land
- High cost of production inputs
- Inefficient marketing system
- Prevalence of calamities
- Pests
- Disregard of farmers of modern farming practices

- Unstable prices of agricultural products
- Inefficient water supply or irrigation

Majority of the agricultural areas are planted to corn which the farmers believed would yield more return for their investments

ANNEX PIIC_9-5

**PROFILE OF PEOPLE IN/AROUND THE PROJECT SITE
IN TAGOLOAN**

(a) Location of respondents

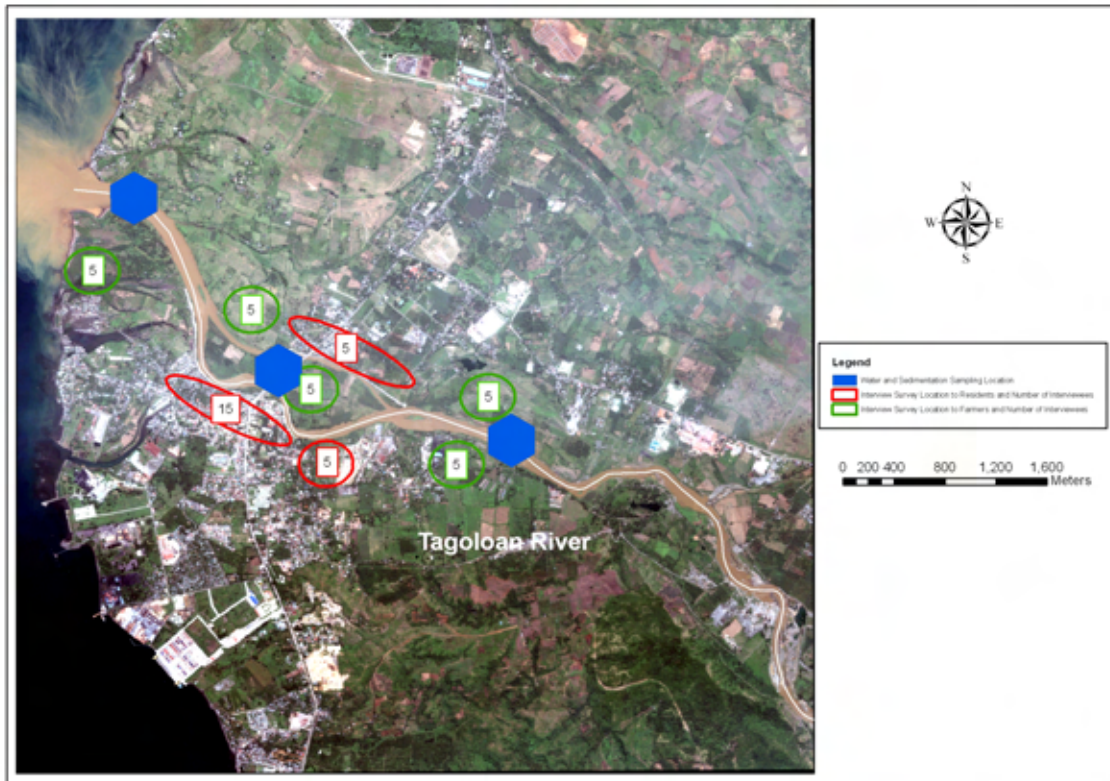


Figure 1 Location of Respondents

(b) Household (HH) heads and family

Gender and age of HH heads

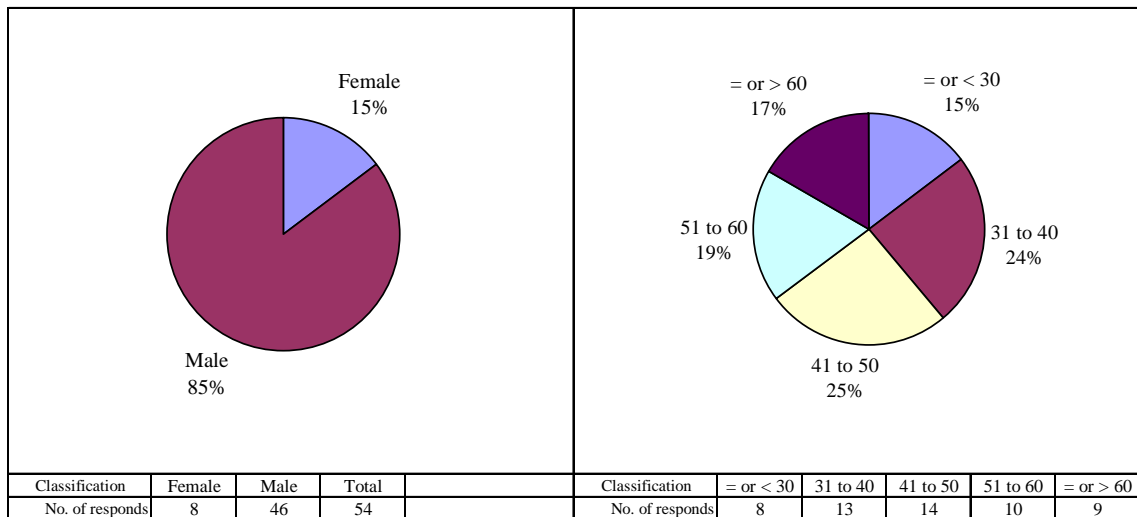
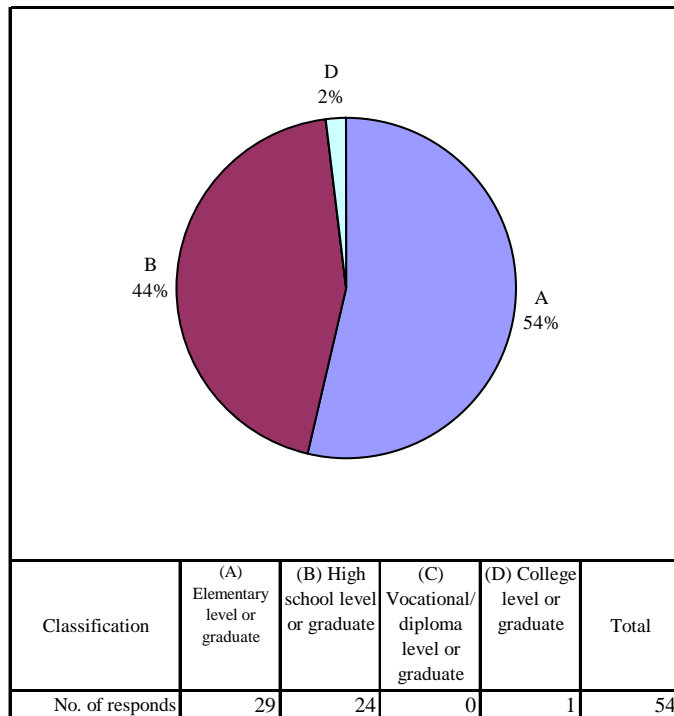


Figure 2 Gender and age of HH Heads

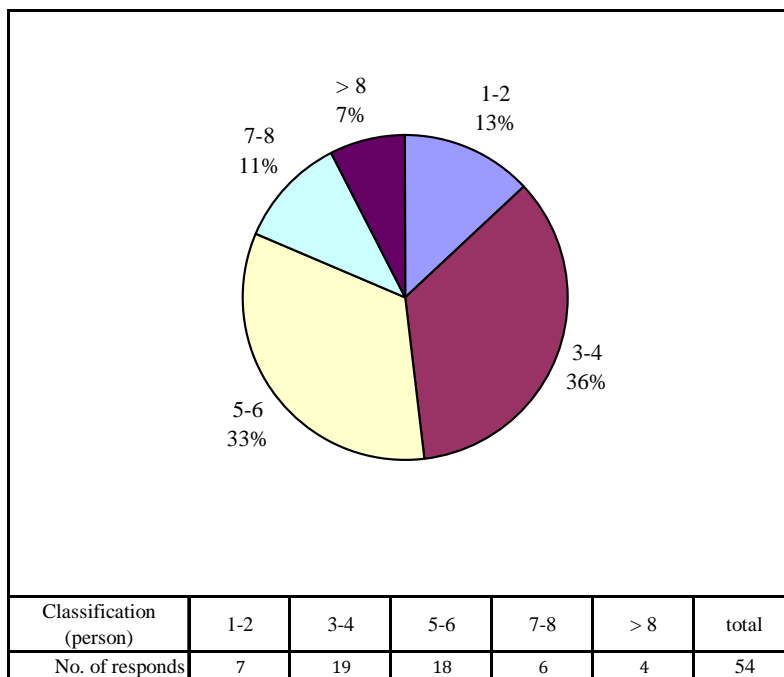
Education of HH heads



Source: JICA Study Team

Figure 3 HH Heads Education

Family composition

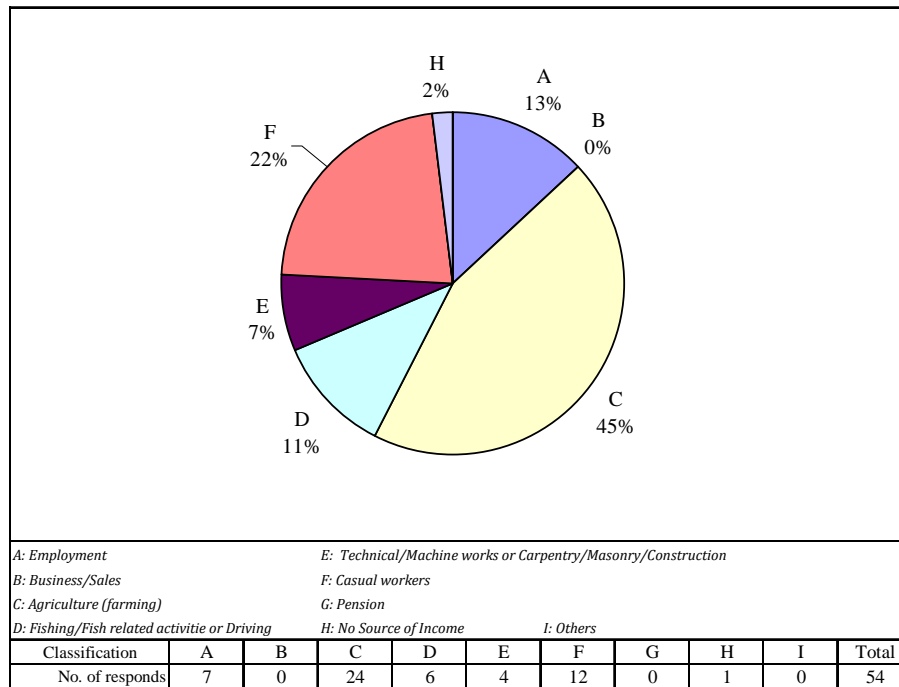


Source: JICA Study Team

Figure 4 Total Numbers of family Members

(c) Economic condition

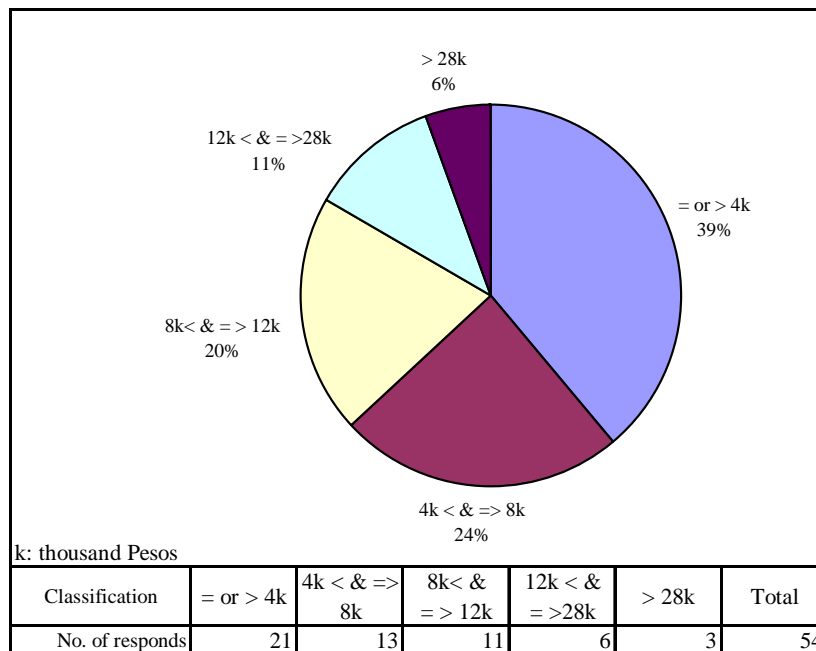
Income source of HH heads



Source: JICA Study Team

Figure 5 Income Source of HH Heads

Family income

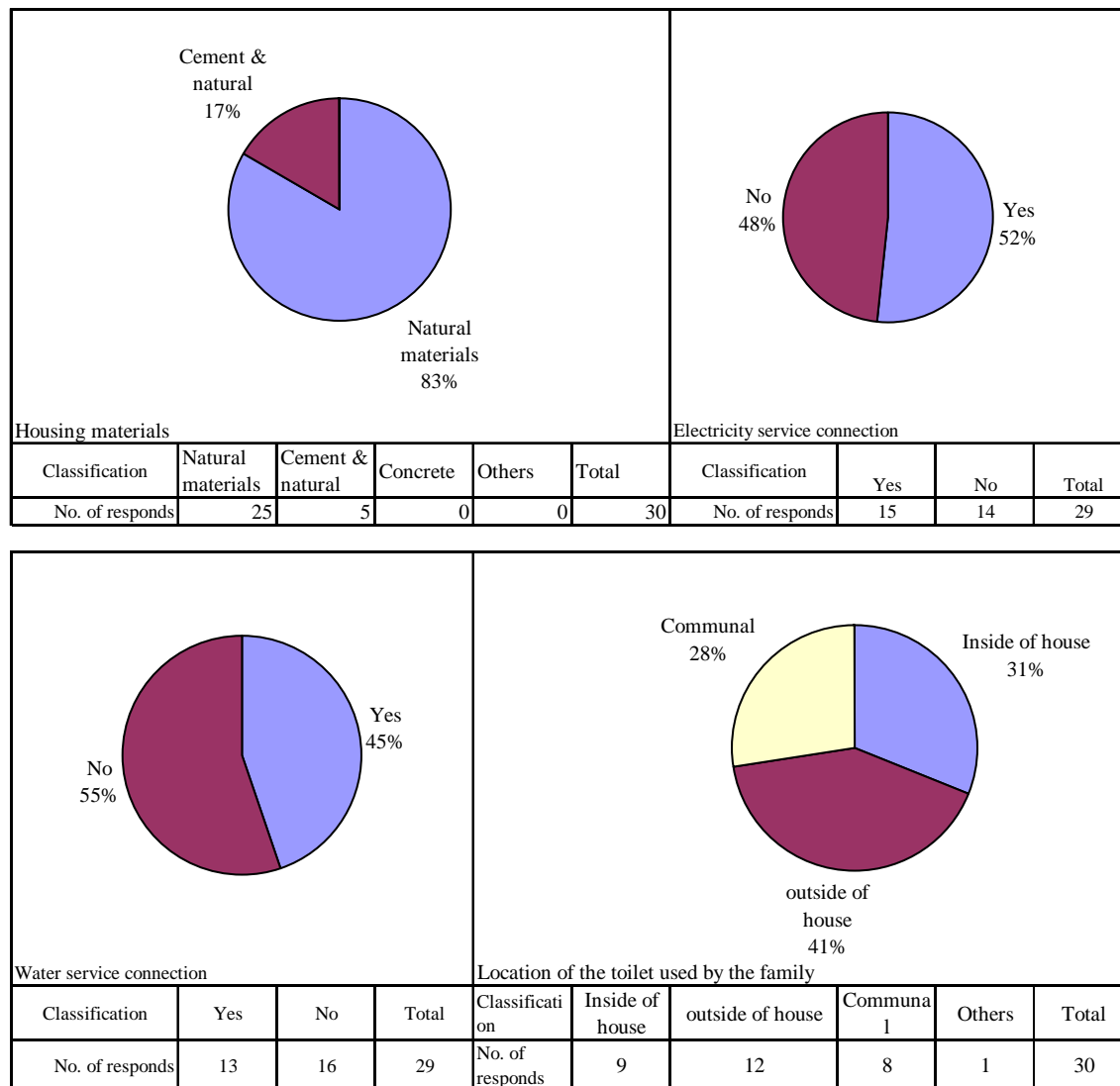


Source: JICA Study Team

Figure 6 Family Income per Month of Respondents

(d) Life condition of HHs

House size and material, Electricity, Water supply and Toilet location

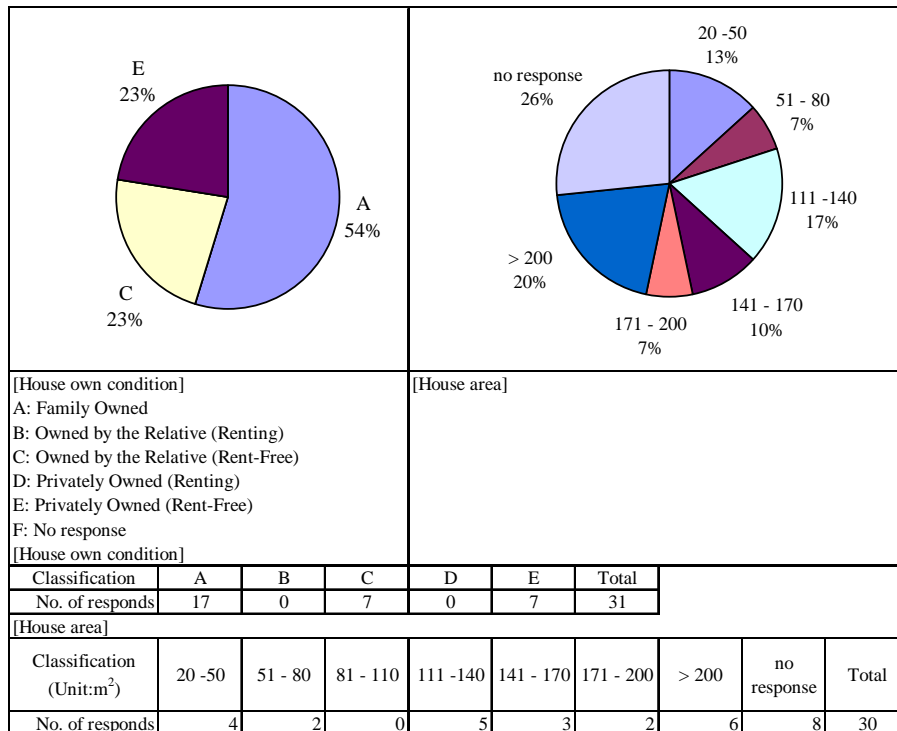


Source: JICA Study Team

Figure 7 Life Conditions of Residents

(e) Property

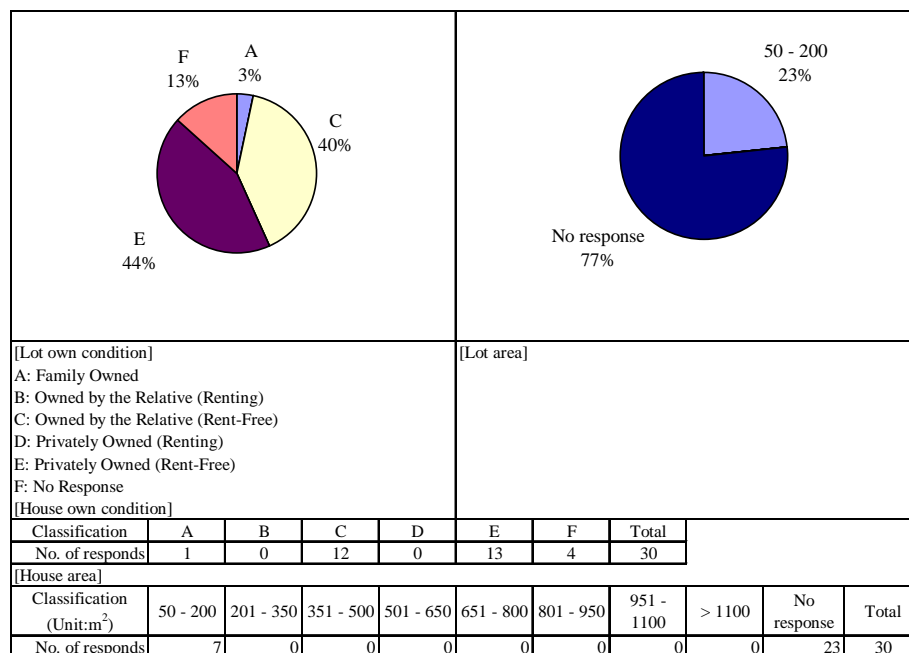
House ownership and size



Source: JICA Study Team

Figure 8 House ownership and size of Residents

Land ownership and size

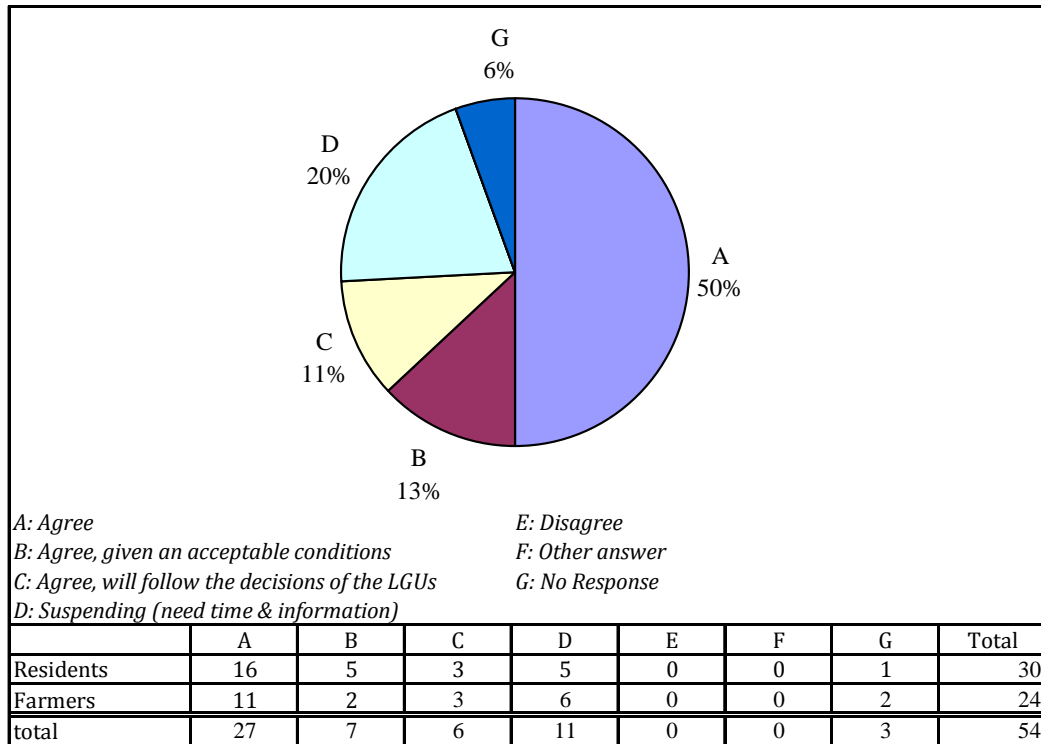


Source: JICA Study Team

Figure 9 House ownership and size of Residents

(f) Opinion on the Project

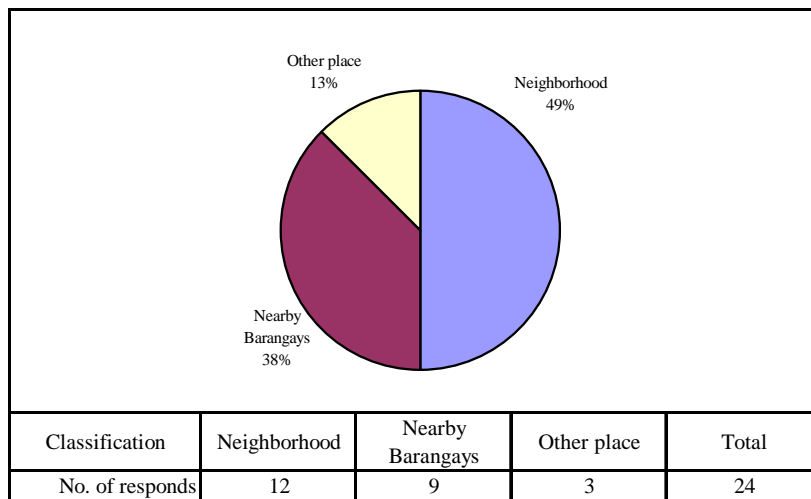
Opinion on relocation



Source: JICA Study Team

Figure 10 Opinion on relocation

Relocation site



Source: JICA Study Team

Figure 11 Opinion on relocation site