INVENTORY BOOK OF DAM (S1/60)

Name of Dam	Alapan Dam (No.S1)
Location of Dam	Alapan I-A, Imus
River/Distance from Rivermouth	Malamok River XX K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	4.65 m
Width of Dam	28 m
Width of Spillway	5.66 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

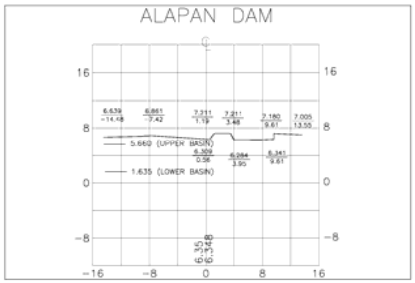
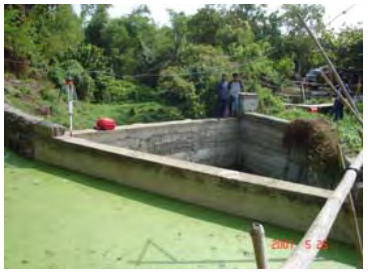


Photo (taken on May 22 2007)



INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S2/60)

Name of Dam	Bago-D Dam (No.S2)
Location of Dam	Bacao I, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 7.79 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.88 m
Width of Dam	7 m
Width of Spillway	7 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

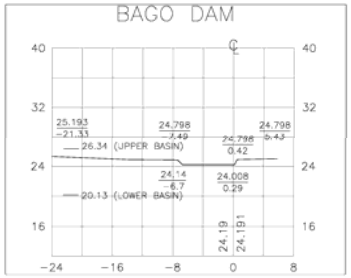


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	about 1m. From the footing				
Cracking	due to stripping of surface				
Stripping of Surface	Major part of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	on both sides				
Cracking	on both sides				
Collapse of Slope	caused by scouring				
Sliding of Slope	lack of support				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	Low / (Medium) / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S3/60)

Name of Dam	Balbakin Dam (No.S3)
Location of Dam	Bucandala V, Imus
River/Distance from Rivermouth	Malamok River xx K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.10 m
Width of Dam	18.32 m
Width of Spillway	3.40 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	Both side of the top support				
Stripping of Surface	Minimal part of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low /(Medium)/ High				
Necessity of Repair	Low /(Medium)/ High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S4/60)

Name of Dam	Puntin Dam (No.S4)
Location of Dam	Bacao I, General Trias
River/Distance from Rivermouth	Tributary of Ylang Ylang River 3.03 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	0.37 m
Width of Dam	14.57 m
Width of Spillway	1.22 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

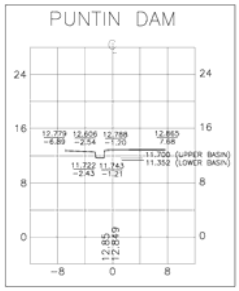


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) / Medium / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S5/60)

Name of Dam	Siroy Dam (No.S5)
Location of Dam	Bacao I, General Trias
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 3.29 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	1.43 m
Width of Dam	11 m
Width of Spillway	7.10 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

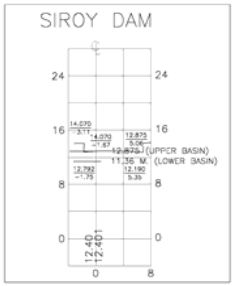


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair	-				
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S6/60)

Name of Dam	Bilad Dam (No.S6)
Location of Dam	Navarro, General Trias
River/Distance from Rivermouth	San Juan River 8.60 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	1.18 m
Width of Dam	15.17 m
Width of Spillway	15.17 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

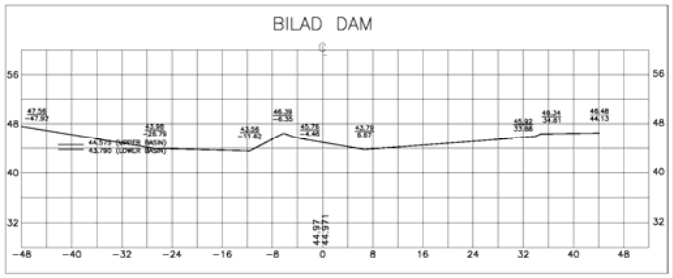


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S7/60)

Name of Dam	Kaliwa Dam (No.S7)
Location of Dam	Navarro, General Trias
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 4.31 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	2.37 m
Width of Dam	m
Width of Spillway	m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

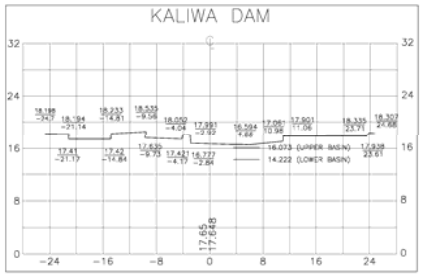


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	about 0.5 m of the bottom				
Cracking	Horizontal crack at the bottom				
Stripping of Surface	Most part of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	both sides				
Cracking	both sides				
Collapse of Slope	caused by scouring				
Sliding of Slope	Lack of support				
Basin Risk in DamBreak	Low /(Medium)/ High				
Necessity of Repair	Low /(Medium)/ High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S8/60)

Name of Dam	Bayan Dam (No.S8)
Location of Dam	Poblacion, General Trias
River/Distance from Rivermouth	San Juan River 10.3K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	7m
Width of Dam	38m
Width of Spillway	38m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

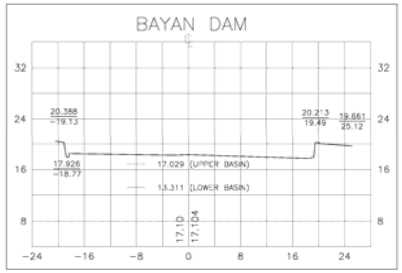


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / (Periodical)	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	0.5m at right side (5m long)				
Cracking	Horizontal Crack (center of slope)				
Stripping of Surface	None				
Others	Broken right side footing				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	Crack on revetment at right side				
Collapse of Slope	due to collapse of revetment				
Sliding of Slope	None				
Basin Risk in DamBreak	Low (Medium) High				
Necessity of Repair	Low (Medium) High				
Assumed Cost of Repair	about 1 million peso				
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S9/60)

Name of Dam	Calubcub Dam (No.S9)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 10.34 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.27 m
Width of Dam	14 m
Width of Spillway	14 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

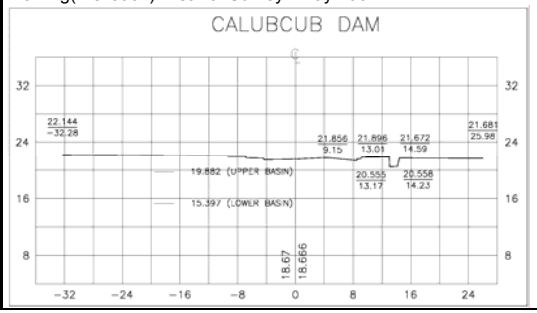


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / (Periodical)	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	Repair on progress				
Scouring of Footing					
Cracking					
Stripping of Surface					
Others					
Side Ground					
Leakage					
Scouring of Footing					
Cracking					
Collapse of Slope					
Sliding of Slope					
Basin Risk in DamBreak	(Low) / Medium / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S10/60)

Name of Dam	Cosme Dam (No.S10)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 5.76 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	1 m
Width of Dam	67 m
Width of Spillway	12 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

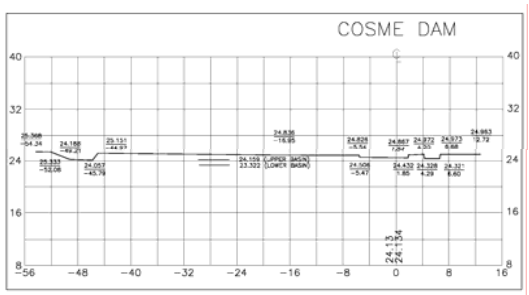


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) / Medium / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S11/60)

Name of Dam	Bago-U Dam (No.s11)
Location of Dam	Pasong Camachile, General Trias
River/Distance	Tributary of San Juan River
from Rivermouth	11.00 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	4 m
Width of Dam	30 m
Width of Spillway	16.23 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

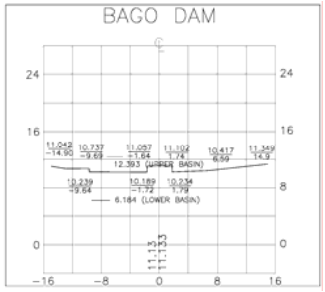


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S12/60)

Name of Dam	Camachile Dam (No.S12)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 12.41 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	2 m
Width of Dam	49.80 m
Width of Spillway	9 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

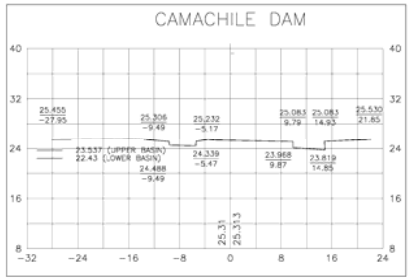


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	Major parts				
Cracking	Most parts				
Stripping of Surface	Major part of the surface				
Others					
Side Ground					
Leakage	Both sides				
Scouring of Footing	on both sides				
Cracking	on both sides				
Collapse of Slope	caused by scouring				
Sliding of Slope	lack of support				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	Low / (Medium) / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S13/60)

Name of Dam	San Gabriel Dam (No.S13)
Location of Dam	Pasong Camachile, General Trias
River/Distance	Tributary of San Juan River
from Rivermouth	12.84 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	1 m
Width of Dam	32. 70 m
Width of Spillway	2.20 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

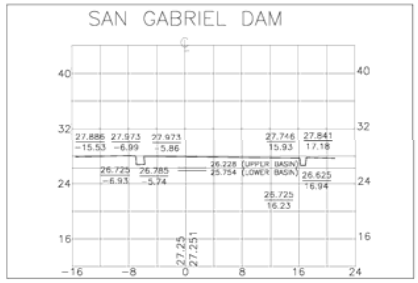


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	on both sides				
Cracking	None				
Collapse of Slope	caused by scouring				
Sliding of Slope	no support				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S14/60)

Name of Dam	Salaan Dam (No.S14)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 11.92 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	4 m
Width of Dam	21 m
Width of Spillway	8 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

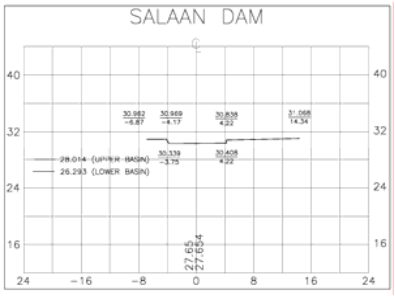


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage					
Scouring of Footing					
Cracking					
Stripping of Surface					
Others					
Side Ground					
Leakage					
Scouring of Footing					
Cracking					
Collapse of Slope					
Sliding of Slope					
Basin Risk in DamBreak	Low / Medium / High				
Necessity of Repair	Low / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S15/60)

Name of Dam	Tapun Dam (No.S15)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 6.69 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	2.50 m
Width of Dam	2.75 m
Width of Spillway	2.75 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

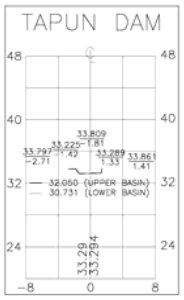


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) / Medium / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S16/60)

Name of Dam	Pasong Kastila Dam (No.S16)
Location of Dam	Malagasang II-D, Imus
River/Distance from Rivermouth	Ylang-Ylang River 8.12 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	6.46 m
Width of Dam	88.32 m
Width of Spillway	61.30 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

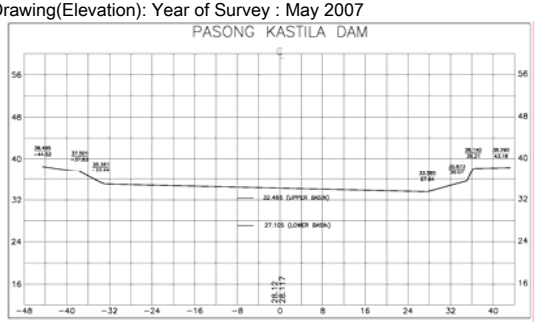


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	Most part of the footing				
Cracking	None				
Stripping of Surface	Majopr part of the surface				
Others	Broken side of the dam				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	none				
Basin Risk in DamBreak	Low / Medium / (High)				
Necessity of Repair	Low / Medium / (High)				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S17/60)

Name of Dam	Hari Dam (No.S17)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 12.84 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.49 m
Width of Dam	50 m
Width of Spillway	6 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

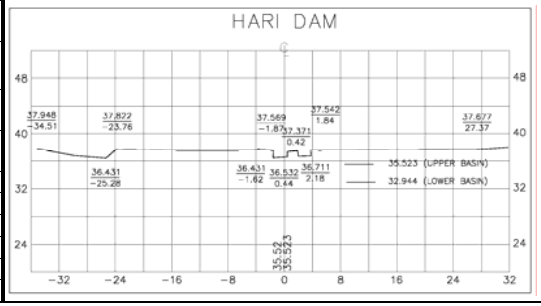


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	0.5 m on both side				
Cracking	Horizontal cracks along the footing				
Stripping of Surface	Major part of the footing surface				
Others					
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S18/60)

Name of Dam	Anton Dam (No.S18)
Location of Dam	Pasong Camachile, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 14.14 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	2.30 m
Width of Dam	50 m
Width of Spillway	8.90 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

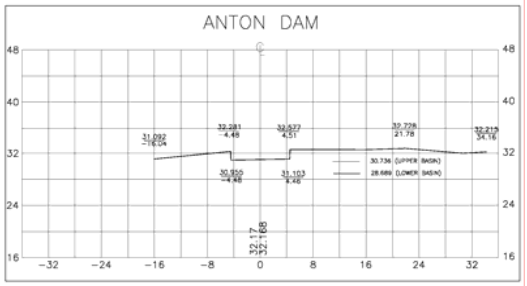


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low /(Medium)/ High				
Necessity of Repair	(Low) /Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S19/60)

Name of Dam	Escribiente I Dam (No.S19)
Location of Dam	Santiago, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 13.58 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3 m
Width of Dam	70 m
Width of Spillway	3.70 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

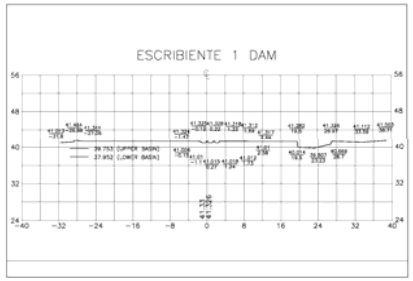


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S20/60)

Name of Dam	Engue Dam (No.S20)
Location of Dam	Santiago, General Trias
River/Distance	Tributary of San Juan River
from Rivermouth	15.28 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	1.55 m
Width of Dam	4.15 m
Width of Spillway	0.77 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

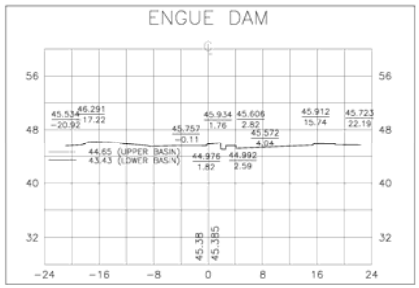


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	on both sides				
Cracking	None				
Stripping of Surface	Minimal part of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S21/60)

Name of Dam	Escribiente II Dam (No.S21)
Location of Dam	Santiago, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 14.69 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.4 m
Width of Dam	41 m
Width of Spillway	11.30 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

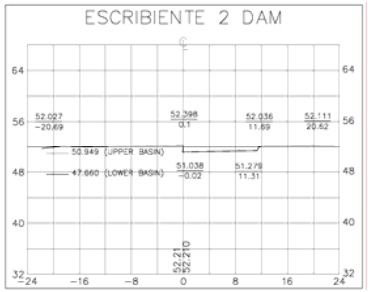


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low /(Medium)/ High				
Necessity of Repair	Low /(Medium)/ High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S22/60)

Name of Dam	Igme Dam (No.S22)
Location of Dam	Santiago, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 15.56 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	5.37 m
Width of Dam	9.20 m
Width of Spillway	9.20 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

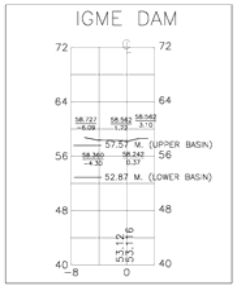


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low (Medium) High				
Necessity of Repair	Low (Medium) High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S23/60)

Name of Dam	Kasundid Dam (No.S23)
Location of Dam	San Jose, Dasmarinas
River/Distance	Ylang-Ylang River
from Rivermouth	12.56 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	6.70 m
Width of Dam	87 m
Width of Spillway	15.60 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

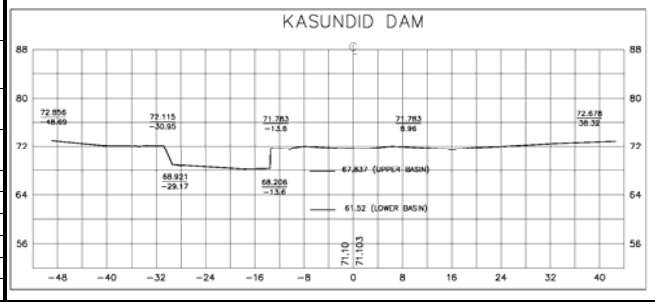


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	right portion of the surface				
Others	hole at the center of the surface				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / Medium (High)				
Necessity of Repair	Low (Medium) High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S24/60)

Name of Dam	Pari Dam (No.S24)
Location of Dam	Buenavista I, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 18.10 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	5 m
Width of Dam	25 m
Width of Spillway	20 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

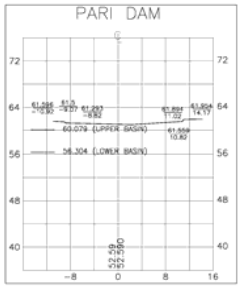


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage					
Scouring of Footing					
Cracking					
Stripping of Surface					
Others					
Side Ground					
Leakage					
Scouring of Footing					
Cracking					
Collapse of Slope					
Sliding of Slope					
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	Low / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S25/60)

Name of Dam	Menes Dam (No.S25)
Location of Dam	San Francisco, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 16.70 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	4.60 m
Width of Dam	16.50 m
Width of Spillway	6 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

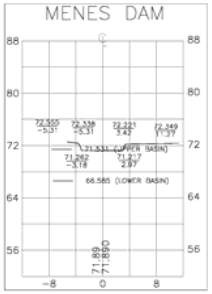


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	Horizontal crack above the surface				
Stripping of Surface	Upper portion of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	on both sides				
Cracking	None				
Collapse of Slope	caused by scouring				
Sliding of Slope	lack of support				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	Low / (Medium) / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S26/60)

Name of Dam	Marcelo Dam (No.S26)
Location of Dam	San Francisco, General Trias
River/Distance from Rivermouth	Ylang-Ylang River 13.46 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	10.70 m
Width of Dam	28.60 m
Width of Spillway	3.70 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

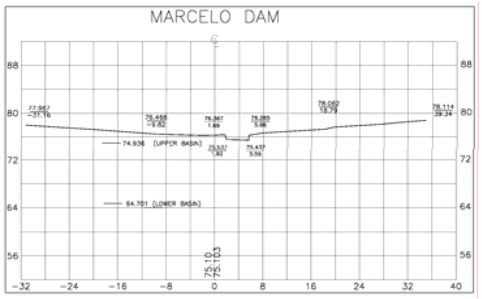


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	Major part of the surface				
Cracking	Horizontal crack				
Stripping of Surface	whole surface stripped				
Others	broken footing				
Side Ground					
Leakage	None				
Scouring of Footing	on both side				
Cracking	None				
Collapse of Slope	both side caused by scouring				
Sliding of Slope	no support fro slope				
Basin Risk in DamBreak	Low / Medium / (High)				
Necessity of Repair	Low / Medium / (High)				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S27/60)

Name of Dam	Hasaan Dam (No.S27)
Location of Dam	Zone III Pob, Dasmarinas
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 13.57 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	28 m
Width of Dam	21.60 m
Width of Spillway	16.30 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

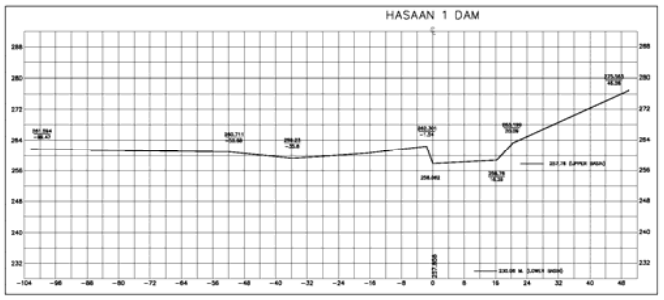


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	Minimal portion of the surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	caused by scouring of ground				
Sliding of Slope	collapse of ground				
Basin Risk in DamBreak	Low (Medium) High				
Necessity of Repair	Low (Medium) High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S28/60)

Name of Dam	Kambing Dam (No.S28)
Location of Dam	Buenavista II, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 19.93 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	4.90 m
Width of Dam	30 m
Width of Spillway	11.40 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

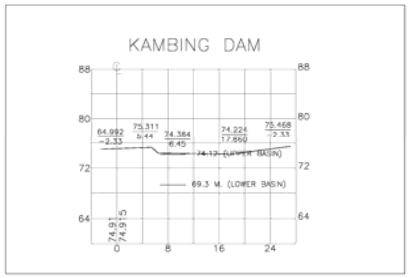


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage					
Scouring of Footing					
Cracking					
Stripping of Surface					
Others					
Side Ground					
Leakage					
Scouring of Footing					
Cracking					
Collapse of Slope					
Sliding of Slope					
Basin Risk in DamBreak	Low / Medium / High				
Necessity of Repair	Low / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S29/60)

Name of Dam	Nacule Dam (No.S29)
Location of Dam	Buenavista II, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 19.48 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	2.50 m
Width of Dam	13.50 m
Width of Spillway	5 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

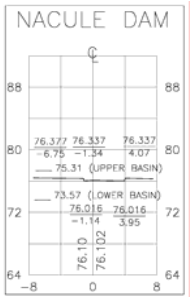


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage					
Scouring of Footing					
Cracking					
Stripping of Surface					
Others					
Side Ground					
Leakage					
Scouring of Footing					
Cracking					
Collapse of Slope					
Sliding of Slope					
Basin Risk in DamBreak	Low / Medium / High				
Necessity of Repair	Low / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S30/60)

Name of Dam	Saulog Dam (No.S30)
Location of Dam	San Agustin III, Dasmarinas
River/Distance	Ylang-Ylang River
from Rivermouth	15.05 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	18.20 m
Width of Dam	38.50 m
Width of Spillway	8 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

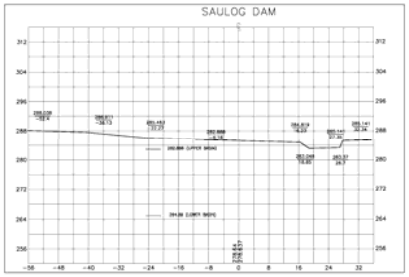


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	right side of the surface				
Cracking	None				
Stripping of Surface	None				
Others	broken right footing				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / Medium / (High)				
Necessity of Repair	Low / Medium / (High)				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S31/60)

Name of Dam	Butas Dam (No.S31)
Location of Dam	San Francisco, General Trias
River/Distance	San Juan River
from Rivermouth	20.69 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	18.90 m
Width of Dam	38 m
Width of Spillway	18.85 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

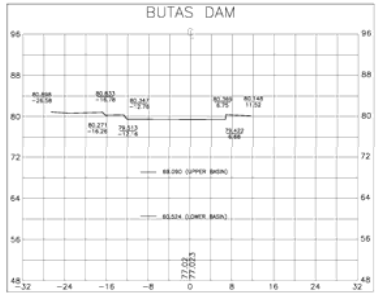


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	right side of the surface				
Scouring of Footing	on the right side				
Cracking	horizontal crack at the center				
Stripping of Surface	upper portion				
Others	None				
Side Ground					
Leakage	right side of dam				
Scouring of Footing	on both sides				
Cracking	collapse already				
Collapse of Slope	collapse already				
Sliding of Slope	collapse already				
Basin Risk in DamBreak	Low / Medium (High)				
Necessity of Repair	Low / Medium (High)				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S32/60)

Name of Dam	Pricilla Munti Dam (No.S32)
Location of Dam	Manggahan, General Trias
River/Distance from Rivermouth	Tributary of San Juan River 21.69 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	3.90 m
Width of Dam	35.50 m
Width of Spillway	11 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

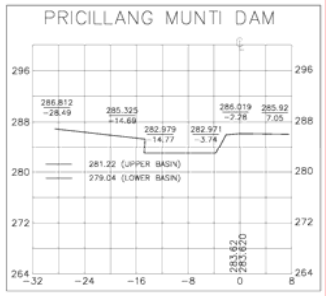


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	San Francisco De Malabon Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	at the center of the surface				
Others					
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) Medium / High				
Necessity of Repair	(Low) Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S33/60)

Name of Dam	Luksuhin Dam (No.S33)
Location of Dam	San Agustin I, Dasmarinas
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 16.87 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	m
Width of Dam	38m
Width of Spillway	m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

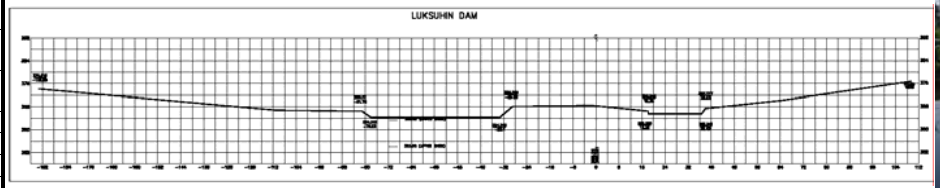


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S34/60)

Name of Dam	Langkaan Dam (No.S34)
Location of Dam	Langkaan II, Dasmarinas
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 17.32 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	23 m
Width of Dam	43 m
Width of Spillway	30 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

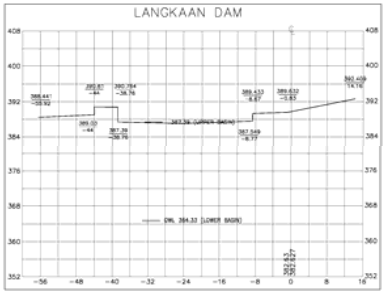


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	None				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	(Low) / Medium / High				
Necessity of Repair	(Low) / Medium / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S35/60)

Name of Dam	Bukal Dam (No.S35)
Location of Dam	Sampaloc II, Dasmarinas
River/Distance from Rivermouth	Tributary of Ylang-Ylang River 19.64 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	31 m
Width of Dam	57.50 m
Width of Spillway	57.50 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

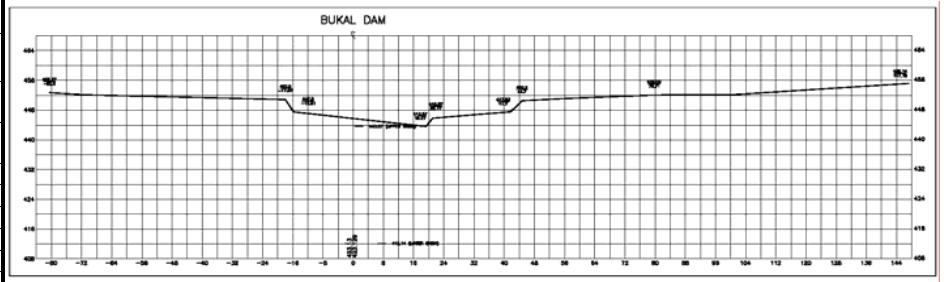


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	mostly at the lower surface				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	on the left side				
Cracking	None				
Collapse of Slope	due to scouring				
Sliding of Slope	no slope protection				
Basin Risk in DamBreak	Low / (Medium) / High				
Necessity of Repair	Low / (Medium) / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

INVENTORY BOOK OF DAM (S36/60)

Name of Dam	San Agustin Dam (No.S36)
Location of Dam	San Francisco, General Trias
River/Distance from Rivermouth	Ylang-Ylang River 19.07 K
Type of Dam	Gravity (Concrete Surfacing)
Dimension	see below
Height of Dam	12 m
Width of Dam	35 m
Width of Spillway	23 m
Height of Spillway	0m(same as crest)
Spillway Gate	None
Intake Gate	None

Drawing(Elevation): Year of Survey : May 2007

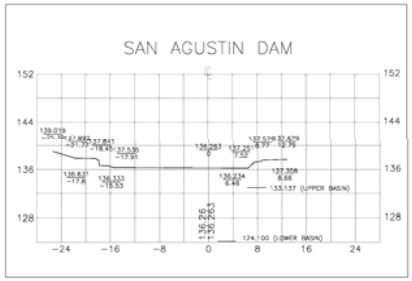


Photo (taken on May 22 2007)

INSPECTION RECORD

General	1	2	3	4	5
Date of Inspection					
Status of Inspection	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical	After Flood*Earthquake / Periodical
Name of Inspector	SUZUKI, Kazuto (JICA Study Team)				
Administration					
Name of Estate	Imus Estate				
Site					
Dam					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Stripping of Surface	at the upper part of the dam				
Others	None				
Side Ground					
Leakage	None				
Scouring of Footing	None				
Cracking	None				
Collapse of Slope	None				
Sliding of Slope	None				
Basin Risk in DamBreak	Low / Medium / (High)				
Necessity of Repair	Low / (Medium) / High				
Assumed Cost of Repair					
Signature					

REPAIRMENT RECORD

General	1	2	3	4	5
Year of Repair					
Description of Repair					
Budget					
Fund/Source					
Contractor					
Place of Contract Document					
Remarks					
Marker					

Appendix-2

Manual for Operation, Maintenance and Management of Structures for Retarding Basin

Chapter 1. Management Area of Retarding Basin

1.1 Boundary and Facilities

1.1.1 Administrative Jurisdiction

Three (3) retarding basins are proposed to be constructed along the middle reaches of three rivers to retard excessive floodwater discharge into lowland areas; namely, the Imus (I1), Bacoor (B4) and Julian (J-1) retarding basins. Since all of the proposed retarding basins are located within the jurisdictional area of the Municipality of Imus, they shall be under the control and management of the Municipal Government of Imus under the expanded policy of the Local Government Code of 1991 and the Water Act, in coordination with the Provincial Government of Cavite.

1.1.2 Facilities of Retarding Basin

As further elaborated in Section 2.1 of Chapter 2, facilities within the Right-of-Way (ROW), as listed in the table below, are to be managed by the designated Administrator of each retarding basin. Administration areas in the retarding basin shall be delineated with stakes at proper points to define the ROW boundary.

Table R A.2 1.1 Facilities of Retarding Basin

Name of Facility	Definition
Surrounding Dike	A dike constructed along the perimeter of retarding basin
Separating Dike	A dike constructed between retarding basin and river channel
Overflow Dike	A dike constructed as inlet of floodwaters into retarding basin
Stilling Pool	A facility to absorb energy in overflow water to protect retarding basin from erosion and scouring. The facility is composed of the following: - **Pool**: Area where Hydraulic Jump takes place and where beds are protected by gabions or concrete blocks. - **End Sill**: A structure with certain height to induce hydraulic jump along perimeter of the pool.
Drainage Sluice	Culvert structure to drain stored water in retarding basin
Drainage Ditch	Ditch made of concrete for drainage along external and internal sides of perimeter dikes.
Basin	Area for storage of floodwater. The area is divided into several zones with respect to the frequency of inundation. It could be utilized as sedimentation trap, recreational area and public space, as mentioned in the item below.
Facilities in Basin	Unless otherwise decreased for storage capacity, some recreational facilities could be placed in the basin. The applicable facilities are as follows: - **Eco-Park**: The lowest bed (zone) could be utilized as ecological park as well as community pond. - **Community Farm**: Some suitable zones could be utilized as community farm during dry season. - **Sports Facility**: Higher zones (low frequency zones in the basin), could be considered for sports facilities such as Basketball Court because basketball is the most popular sports in the Philippines - **Sunday Market/Barangay Communication Space/Others**: Higher zones (low frequency zones) or expanded access roads also may be considered for Sunday market, communication space, public parking lot, or public space for neighboring barangays.

The Municipal Government of Imus, as the main administrative agency, should maintain and control the above facilities in the retarding basin, and manage the announcement of warning signs/signals through the community disaster management organizations in the event of flood. At the same time, it has the responsibility to preserve the natural environment of the retarding basin through periodical patrol, inspection and maintenance works, including monitoring and controlling of encroachment, illegal use and dumping activities. All of such tasks shall be conducted in coordination with the Provincial Government of Cavite.

As for the maintenance and operation of each recreational and public facility in the retarding basin, the Municipal Government of Imus shall entrust the responsibility to the neighboring barangay(s) and/or communities concerned.

1.2 Inventory and Maintenance Record of Facilities

To facilitate the management of each retarding basin, the Administrative Agency (the Municipal Government of Imus) shall maintain updated inventories and maintenance records for each retarding basin, which shall contain relevant information including features of dike and flood mitigation

facilities as well as facilities for amenity or recreation. The following inventory and maintenance records shall be prepared separately, maintained/updated by the Administrative Agency in coordination with the Provincial Government of Cavite, and approved by the Flood Mitigation Committee (FMC):

- Record of approximate extent/area of each zone and land use including storage area for floodwaters in the retarding basin;
- Maintenance record of cleaning activities in the retarding basin including disposed volumes of sediment;
- Repair record of facilities with flood mitigation functions, including place, type of repair, repair cost, and commencement/termination date of repair work; and
- Date and water depth of retarded water inflow into the retarding basin.

On the other hand, the following records regarding amenity and recreational facilities shall be prepared and maintained/updated by the Barangay designated by the Administrative Agency for each retarding basin:

- List of facilities, including extent, dimensions, purpose and installation initial cost; and
- Maintenance and repair record, including date, contents of activities, the costs, budget source of activities/repair

Chapter 2. Operation and Maintenance of Retarding Basins

2.1 Facilities under the Administration of the Municipal Government of Imus

As described in Chapter 1, facilities/structures in the retarding basin shall be managed by the Municipal Government of Imus. The three retarding basins, Imus (I1), Bacoor (B4) and Julian (J-1), will be constructed along the middle reach of each of the three rivers to retard excessive floodwater discharge into the lowland area. The construction of these basins is scheduled to be completed by the end of 2013, and the features and effectiveness of facilities installed in each basin are to be listed according to the parameters shown in the table below.

Table R A.2 2.1 Features and Effectiveness of Retarding Basin Facilities

Description	Imus (I1)	Bacoor (B4)	Julian (J1)	Remarks
Design Flood Scale	10-year	2-year	5-year	
Storage Volume (MCM)				
2-Year Flood Probability				
5-Year Flood Probability				
10-Year Flood Probability				
20-year Flood Probability				
Length of Surrounding Dike	km	km	km	
Length of Separating Dike	km	km	km	
Maximum Height of Dike	m	m	m	from Ground
Overflow Dike				
Elevation of Crest	EL+	EL+	EL+	
Length	m	m	m	
Drainage Sluice				
Elevation of Bed	EL+	EL+	EL+	
Length	m	m	m	
Dimensions of Culvert	m x m	m x m	m x m	B x H
Length of External Drainage Ditch				B x H = 0.3m x 0.3m
Length of Internal Drainage Ditch-1				On Berm
Length of Internal Drainage Ditch-2				On Bottom

2.2 Inventory of River Infrastructures

To facilitate and carry out the inspection and maintenance of facilities effectively, inventories of all major facilities installed at each retarding basin shall be prepared and updated as described in Chapter 1, and shall include the following data and information:

(1) Name and number of each facility;

(2) Location of each facility; and

(3) Structural size, type and quantity of each facility.

All facilities in the retarding basin shall be inventoried; however, detailed assessment shall be made for those specified in the preceding Section 2.1, which have direct retarding and storage functions. The structures/facilities not to be provided with detailed assessment in the inventory are those for amenity, recreation and public communication, and these indirect facilities for storage function shall be assessed by the concerned Barangay in terms of safety and security.

2.3 Classification of O&M Works

2.3.1 Classification of Inspection Works

The inspection of facilities aims at detecting deterioration in function of facilities including fatigue/decrepitude of structures and mechanical troubles. The following methods and measures shall be applied: (a) visual inspection; (b) inspection by touch and sense of hearing on the facilities; (c) operation test and measurement by simple tools; and (d) replacement.

Inspection work is classified into four categories which shall be done as follows:

(1) Monthly Routine Inspection shall be made by visual inspection at the specified time in a month. The objectives of inspection shall be outward appearance and cleanliness.

(2) Annual Periodical Inspection should be made at regular interval throughout the year in accordance with the schedule which shall be prepared beforehand.

(3) Replacement Inspection shall be made at a certain interval of years to detect defects and repair the facilities in accordance with the schedule which shall be prepared beforehand.

(4) Temporary Inspection shall be made immediately after the occurrence of a disaster such as extensive scale of flood and earthquake which could cause abnormal condition of facilities in the retarding basin. The objective items of the Temporary Inspection shall include those for Annual Routine and Periodical Inspection, and be determined in accordance with the scale and characteristics of the disaster.

2.3.2 Classification of Maintenance Works

Maintenance aims at detecting deterioration and rehabilitating the function of facilities, including fatigue/decrepitude of facilities and mechanical troubles. The work is broadly classified into the following three categories:

(1) Preventive Maintenance

Preventive maintenance aims at keeping the originally designed function of the retarding basin through the following three kinds of activities:

- Routine Maintenance, which includes all repetitive activities to be performed throughout a year such as removal of weeds/garbage, and removal of sediment deposits in front of the flap gate of drainage sluice;
- Periodical Maintenance, which includes all repetitive activities to be performed throughout a year such as removal of weeds/garbage, and removal of sediment deposits in stilling basin and on overflow dike, lubrication of mechanical facilities, repainting of metal parts, together with cleaning activities in the whole retarding basin area with the cooperation of communities such as Barangays and the NGOs; and
- Small Repair Works, which include works necessary for the restoration of a facility such as repair of small cracks, holes or detached structural parts, and replacement of damaged facilities.

(2) Corrective Maintenance

Corrective maintenance aims at a more substantial repair/replacement work than the Preventive Maintenance to restore a facility which has a considerable reduction of the function originally designed due to overage and/or damage. The removal and disposal of sediment materials and weeds/garbage utilizing hauling and excavation equipment in the whole area of a retarding basin (Sedimentation Removal Works) are categorized as Corrective Maintenance. It is herein preliminarily proposed that repair works costing more than 1 million pesos shall be classified as Corrective Maintenance, while those of less than 1 million pesos are small repair works under Preventive Maintenance.

(3) Emergency Maintenance

Emergency maintenance is executed against the imminent failure of infrastructure due to the extensive scale of a disaster such as huge flood and earthquake.

2.3.3 Classification of Operation Works

Flap gates attached to the outlet of drainage sluice and the vertical slide gate attached to the outlet of sediment trap gate, which are the only mechanical structures installed in the retarding basin, will not require operation in flood events. However, the operation works described below will be required for the observation and confirmation of safe inflow of floodwater into the retarding basin.

In addition, it is important to maintain the retarding basin in good operational condition to avoid vulnerability leading to the loss of human life and decrease of flood mitigation effectiveness in flood events. In this connection, daily management in and around the retarding basin will be required. In particular, residence within the area of the retarding basin should be disallowed, absolutely.

(1) Observation of Inflow

The condition of inflow on the overflow dike area shall be observed and recorded in case of typhoon or continuous heavy rainfall.

(2) Instruction to People enjoying Recreational Facilities in the Retarding Basin

Some people might continue playing and enjoying a facility in the retarding basin in spite of heavy rainfall. In such cases, they shall be instructed to take refuge and stay away from the retarding basin area immediately.

(3) Daily Operation of Observation/Inspection in the Retarding Basin

The condition in retarding basin shall be observed and recorded as one of the daily activities of the MDCC.

2.4 Work Procedures for O&M of Retarding Basin

2.4.1 Execution of Maintenance Works

As described above, maintenance work is classified into preventive maintenance, corrective maintenance and emergency maintenance. Among them, preventive maintenance shall be the major responsibility of the Municipal Government of Imus in due consideration of the following conditions:

(1) Preventive maintenance can be performed based on a definite and consistent annual program. On the other hand, most of the corrective and emergency maintenance works except for removal of sediment materials in the retarding basin are required on the ad-hoc basis and, therefore, it is virtually difficult to formulate an annual maintenance program for them in advance.

(2) Both corrective and emergency maintenance are oriented to the replacement of structures/facilities which have exceeded their economic life and/or damaged by large-scale natural disasters. Such replacement is deemed to fall under the responsibility of not only the Municipality of Imus but also other concerned agencies, particularly, the Provincial Government of Cavite and DPWH.

(3) In connection with the above item (2), both of the corrective and emergency maintenance may require implementation within a short period of time as well as a large amount of cost and the budgetary arrangement for them is far beyond of the capacity of the Municipal Government of Imus. In such cases, the corrective and emergency maintenance would need to be implemented as provincial or national works under the responsibility of the provincial or national governments.

It is further presumed that a major part of the preventive maintenance works could be hardly implemented on the force-account basis by the Municipal Government of Imus because of financial resource constraints. It may be better to spend the usage charge collected from the recreational facilities in the retarding basin, or to cooperate with the NGOs and provide manpower from the neighboring barangays. From this viewpoint, the routine and periodic maintenance works and a part of the small repair works other than inspection works shall be executed with the cooperation of barangays and NGOs through a voluntary agreement known locally as “Bayanihan” based on the measures given in the table below.

Small repair works also shall be executed based on the sketch drawing of the area and the standard typical drawing containing brief work instructions and technical specifications but without detailed design. It is desirable, whenever possible, to implement the works by labor-intensive means in cooperation and in association with the Municipal Government, barangays and NGOs.

As for Sedimentation Removal Work, the work shall be executed on contract basis, in association with the Provincial Government and the District Engineering Office of DPWH and in accordance with the guideline and standard for civil works contracts and procurement of the Province of Cavite or the DPWH.

The required standard preventive and corrective maintenance works are as listed in the following tables respectively, and the details are as described in the succeeding sections.

Table R A.2 2.2 Proposed Work Items for Preventive Maintenance

Work item	Objective Facility	Time Interval of Work	Assumed Standard Annual Work Volume
Removal of garbage	Around Drainage Sluice and Overflow Dike and in whole retarding basin	Twice a year	As required
Removal of sediment deposit	- Stilling Basin of Overflow Dike - Drainage Ditches, Drainage Sluice	Twice a year	As required
Cutting/Removal of grass on dike slope and retarding basin	- Surrounding Dike and Separating Dike - Retarding Basin	Once a year	Entire area of Retarding Basin
Small repair for earth dike	Earth Dike	Once a year	About 0.5% of the entire surface
Small repair for overflow dike	Overflow Dike	Once a year	About 0.5% of the entire surface
Small repair for structures other than dikes	- Revetment - Foundation works of all riparian structures	As required	
Lubrication of mechanical facilities	Flap Gates	Once a year	As required
Small-scale repainting for detached metal parts	Flap Gates	As required	As required

Table R A.2 2.3 Proposed Work Items for Corrective Maintenance

Work Item	Objective Facility	Time Interval of Work	Standard Annual Work Volume
Removal of sediment deposit	- Whole Area in Retarding Basin - Pocket dams and Sabo dams	Once in 3 years	As required
Cross-sectional retarding basin survey	Retarding basin to confirm storage capacity	Once in 3 years	With an interval of 100 to 200m
Leveling Survey	Crown of Surrounding Dike, Separating Dike, Overflow Dike and ground surface of retarding basin	Once in 3 years	With an interval of 100 to 200m
Repair for earth dike	Earth Dike	As required	As required
Repair for overflow dike	Overflow Dike	As required	As required
Repair for structures other than dikes	- Revetment - Foundation works of all riparian structures	As required	About 1% of the entire surface
Replacement of Flap Gate	Drainage Sluice	As required	As required

2.4.2 Execution of Operation Works

Proper observation of overflow conditions and instructions to people during floods are essential for the sustainability of flood mitigation effectiveness. In addition, proper management in and around the retarding basin is required through the daily activities of the MDCC or the Municipal Government of Imus. Accordingly, a major part of the operation works shall be executed on the force-account basis by personnel of the Municipal Government of Imus as one of the major activities of the MDCC.

In exceptional cases where gate operation works are required on the ad-hoc bases, the operation works for sediment trap gates in the retarding basin, if any, shall be considered. However, it is virtually difficult for the Municipal Government of Imus to assign its limited number of permanent personnel for the operation of such gates. Under the circumstances, the Municipal Government of Imus shall

entrust the operation of these gates to barangay residents on the premise that the operation shall be made through the instruction and supervision of the municipal government.

The required standard operation works are as listed in the following table.

Table A.2 2.4 Proposed Work Items for Operation Works

Operational Condition	Work Items	Items to be Confirmed	Time Interval of Work	Assumed Standard Annual Work Volume
Normal Condition	Observation of Retarding Basin	- Existence of residence in/around retarding basin - Confirmation of utilization in retarding basin area - Modification of shape of facilities - Existence of new facilities without approval	Once a month	As required
	Permit of installation of facilities in retarding basin	- List of facilities of retarding basin - List of amenity and recreational facilities by barangay and community	Once a year	As required
	Preparation of O&M Program	- All activities considered for O&M and prioritization - Whole retarding basin area	Once a year	As required
	Operation of Gate	Opening and closing of gates	As required	As required
	Awareness Campaign	Enlightenment of effectiveness and restriction of activity in retarding basin to the residents	As required	As required
During Flood	Observation of Inflow on Overflow Dike	- Overflow condition and confirmation of harmless flow - Record of Maximum Water Level of stored water	As required	As required
	Instruction to People in Retarding Basin	Advice for evacuation from retarding basin area in coordination with barangay and NGOs	As required	As required

2.4.3 Procedure of Formulation and Execution of Annual O&M Program

The Municipal Government of Imus shall undertake the following procedures to formulate and execute the annual O&M Program on the premise of execution of the O&M works mentioned above.

(1) Formulation of Annual O&M Program

- Estimate and propose the necessary O&M works, indicating the necessary O&M cost for each work/activity.
- Determine the entire scope of the O&M works, taking into account the available fund and the priority of maintenance works listed below.

  First Priority:

  - ✓ Maintenance of overflow dike, which are directly related to the floodwater inflow into retarding basin.
  - ✓ Maintenance of drainage sluice, which are directly related to the floodwater drainage toward river channel.
  - ✓ Rehabilitation of critical damages of surrounding and separating dike, which leads to the decrease of flood mitigation effectiveness.
  - ✓ Removal of critical sediment deposits in the retarding basin, which would seriously affect flood mitigation effectiveness.
  - ✓ Emergency rehabilitation works, which are endorsed by the Flood Mitigation Committee and the Provincial Government of Cavite.

  Second Priority:

  - ✓ Lubrication of installed flap gates or other gates.
  - ✓ Rehabilitation of minor damages to facilities in the retarding basin that would not still lead to disastrous decrease of flood mitigation effectiveness.

Third Priority:

- ✓ All maintenance works other than the above first and second priority works.

- Formulate the draft of the O&M program, which shall include the implementation/disbursement schedule and procurement/execution method for the O&M works.
- Verify and approve the draft of the maintenance program.
- Input the O&M program into the entire work and budgetary plan of the Provincial Government of Cavite.

(2) Execution of O&M Works

- Execute the O&M works through either the force-account basis or the contract basis in accordance with the O&M program.
- Submit the field inspection report to the Secretariat of the Flood Mitigation Committee every month, and execute the follow-up action for the immediate/emergency repair, as required.
- Submit the monthly and annual reports on the O&M works to the Secretariat of the Flood Mitigation Committee.

(3) Evaluation of O&M in the Year

- Evaluate the results of the whole O&M works executed in the year, including the following objectives of evaluation:
  - ✓ Validity of the selected maintenance method.
  - ✓ Viability of implementation period of maintenance (the date of commencement and duration).
  - ✓ Viability of the estimated O&M cost and quantity of manpower for the actual O&M works required.
  - ✓ Effectiveness and actual stored water volume in the retarding basin.
  - ✓ Validity of frequency of maintenance works for each of the objective facilities.
  - ✓ Effectiveness of dissemination of O&M activities among the local communities.
  - ✓ Progress of community development, which could support the O&M works.
- Revise the O&M manual(s), as required, based on the results of evaluation on the O&M works executed in the year.

2.5 Job Description of O&M Works for Retarding Basin

The organizational set-up of the MDCC in the Municipal Government of Imus as well as the Flood Mitigation Committee (FMC) has been proposed in the Master Plan, and a part of such organization has been activated. The tasks to be undertaken by each organization are as described below.

2.5.1 Flood Mitigation Committee (FMC)

The FMC has the tasks to approve the annual O&M programs prepared by the MDCC and the Municipal Government of Imus, and to consider/allocate the budget and cost for annual O&M activities and works in coordination with the Provincial Government of Cavite and the Cavite Engineering District Office of DPWH. In addition, the FMC has the responsibility to store and save the O&M records submitted by the Municipal Government of Imus as yearly records or books.

2.5.2 Provincial Government of Cavite

The Engineering Office of the Provincial Government shall assist and support the formulation of annual O&M programs by the Municipal Government of Imus and their implementation. In addition,

the PPDO shall coordinate programs and implementation schedules among the agencies concerned as approved by the Secretariat of FMC. The PDCC shall also assist in the operation activities of the Municipal Government of Imus and the MDCC.

2.5.3 Cavite District Engineering Office of DPWH

The Cavite District Engineering Office of DPWH shall assist and support the formulation of annual O&M programs. In addition, a part of the annual budget of the engineering office shall be allocated for the implementation of O&M programs with the approval of FMC.

2.5.4 Municipal Government of Imus and MDCC

The Municipal Government of Imus through MDCC shall undertake the following tasks:

- Determination of the entire scope of the O&M works, taking into account the available fund and manpower, as well as the priorities of maintenance work. (Proposal should be made jointly and in consultation with the Provincial Engineering Office and Cavite District Office of DPWH and determined with the approval of FMC.)
- Estimation of cost required for the entire O&M works.
- Input of O&M programs into the entire work and budgetary plan of the Provincial Government of Cavite.
- Submission of the proposed O&M program to the FMC through PPDO.
- Assignment of personnel for O&M work.

2.5.5 NGOs

NGOs, such as Sagip Ilog Imus, shall be requested to participate in the O&M program for retarding basins.

2.6 Equipment, Tools and Materials for Inspection and Maintenance

The priority equipment, tools and materials to be provided to personnel of the Municipal Government of Imus, which shall be assigned for the inspection and maintenance through force-account are as described below.

2.6.1 Equipment, Tools and Materials for Inspection

Equipment, tools and materials for inspection are as listed below:

- Uniform
- Camera
- Radio communication equipment (handy-talky)
- Measuring tape, pole and staff gage
- Rope
- Stake
- Field Book

2.6.2 Equipment, Tools and Materials for Preventive Maintenance Work

As described above, a substantial part of the maintenance works (corrective maintenance works) would need to be carried out by the Municipal Government of Imus on the contract basis instead of the force-account basis. Heavy equipment and machineries owned by the Municipal Government of Imus are limited in number. In this connection, the Municipal Government of Imus shall focus on year-round force-account activities such as routine and periodic maintenance, emergency small repair work, and observation/instruction activities as operational works, including community manpower. To achieve these force-account activities, the following equipment, tools and materials shall be prepared for maintenance:

- Mechanical grass cutters for grass cutting, which is a year-around activity to be carried out by force-account or “Bayanihan.”
- Mechanical hand compactors, which are useful for various compaction works as a part of rehabilitation and at the same time could be hired out to a contractor.
- Small trucks with the capacity of around 2 tons for the transport of materials, equipment and laborers.

Chapter 3. Technical Guideline for Operation and Maintenance of Retarding Basin Facilities

3.1 Inspection and Maintenance of Earth Dike (Surrounding Dike and Separating Dike)

Surrounding dike and separating dike will be constructed along the perimeter of each retarding basin. The dikes will function to confine stored floodwater within the retarding basin, and the routine and periodical inspection of dikes shall be performed to check the overgrowth of weeds, cracks and seepage at the bank crown, shoulder and slope. Based on the inspections, preventive and corrective maintenance shall be executed, including replacement of revetment, foundation and confluent works.

3.1.1 Inspection

The principal items for inspection are as enumerated below:

- Overgrowth of weeds which may deteriorate the stability and durability of embankment.
- Erosion and/or collapse.
- Cracks [Cracks of dike are usually caused by: (i) excessive saturation due to seepage of water; (ii) contraction of dike; and (iii) earthquake.]
- Leakage of water and piping.
- Subsidence/Rise of crown level.
- Slope failure (Slope failure is usually caused by increase in unit weight of soil saturated due to rainwater or seepage of water and also by decrease of shearing resistance against the weight.)
- Cave-in on Landside Slope [The initial cause of cave-in in the dike is the occurrence of void due to: (i) leakage of water; (ii) washing away of backfill materials caused by fault of sluice joint or impervious wall; and (iii) insufficient compaction of refilled soil for built-in facility and backfill sand of retaining wall. The void gradually develops into cavities, which appear on the dike crown.]

3.1.2 Maintenance

The principal items for maintenance are as enumerated below:

- Removal of Grass: Periodical removal of overgrowing grass and weeds on the embankment by mechanical or manpower cutting measures.
- Rehabilitation of Dike Crown and Access Road Pavement: Filling of dike crown with high quality soil having appropriate moisture content, compaction of fill by tamper for small-scale damage or by vibration roller and bulldozer for large-scale damage, provision of sods at the dike shoulder, and installation of concrete pavement after subsoil compaction in accordance with the specifications to be applied.
- Rehabilitation of Dike Slope: Filling of dike slope with high quality soil having appropriate moisture content in the order of stripping, bench cut, staking, slope-tamping, sodding and driving of support skewer.
- Rehabilitation of Slope Failure: Removal of muddy and poor quality soil, replacement with high quality soil with enough compaction, and provision of leakage-proof works or mitigation of the slope gradient, if necessary.
- Rehabilitation of Cave-in: Conduct of detailed investigation of cavities in the bank and removal/reconstruction of embankment body with cavities, or filling-up of cavities.
- Rehabilitation of Cracks: Excavation of dike body along cracks in V-shape, and backfill of high quality soil with sufficient compaction.

3.2 Inspection and Maintenance of Overflow Dike

Gabion type overflow dike will be constructed at designated location with appropriate elevation and length along separating dike of each retarding basin.

3.2.1 Inspection

The principal items for inspection are as enumerated below:

- Overgrowth of weeds, which may deteriorate the stability and durability of gabions.
- Collapse (Cracks of dike are usually caused by: (i) impact by debris; (ii) excessive stress due to overflow beyond designed height of water depth; (iii) vandalizing; (iv) aging; and (v) earthquake.)
- Excessive leakage of water and piping.
- Subsidence/Rise of crown level.

3.2.2 Maintenance

The principal items for maintenance are as enumerated below:

- Removal of Grass: Periodical removal of overgrowing grass and weeds on/in the gabion dike by mechanical or manpower cutting measures.
- Rehabilitation of Dike: Reassembly of gabion-set with refilling of cobblestones of appropriate diameter in the dike, connecting each gabion and rehabilitating them with designated materials in accordance with the specifications to be applied.

3.3 Inspection and Maintenance of Revetment

Revetment will be constructed to protect the foot, slope and berm of dike against scouring and erosion around overflow dike, drainage sluice and some designated sections on riverside.

Careful attention on inspection and maintenance is required since the revetment faces the rapid discharge flow and tends to be affected by the fluctuation of riverbed. Slope protection, in particular, shall be maintained well even in small trouble spots, because it is important to prevent initial destruction which could lead to damage of the entire structure. When the foundation above the riverbed is exposed, additional foot protection shall be set, and some reinforcements such as riprap and gabions are required if local scouring is found and the foundation is caving.

3.3.1 Inspection

The principal items for inspection are as enumerated below:

- Cracks on the slope pavement.
- Condition (erosion, scoring, etc.) of the foundation and side slope pavement of the revetment. (This inspection could be made only during low water level.)
- Condition of construction joints and upper/lower ends of revetment works.

3.3.2 Maintenance

The principal items for maintenance are as enumerated below:

- Causes of Damage (Necessary rehabilitation should be made based on the results of detailed investigation on the causes of damage.)
- Bank Erosion (Countermeasures against erosion should be executed immediately after a new bank erosion is found.)

3.4 Inspection and Maintenance of Groundsill

Groundsill will be constructed at designated river cross-sections near the retarding basin to minimize the fluctuation of riverbed.

When the foundation of groundsill is damaged, chemical or cement grouting through holes drilled in the groundsill by concrete cutter will be required to strengthen the foundation. Sheet piling and/or waterproof apron provided at the upstream and downstream of the groundsill will be effective against certain types of damage.

3.4.1 Inspection

The principal items for inspection are as enumerated below:

- Garbage, trees and any other drift materials twining around groundsill.
- Slope failure of sidewall apron.
- Cracks on the main body and downstream apron.
- Erosion or scouring of foundation and side slope.

3.4.2 Maintenance

The principal items for maintenance are as enumerated below:

- Garbage, trees and any other drift materials twining around groundsill (Removal is required.)
- Slope failure (Filling with high quality concrete is required.)
- Cracks of Concrete Structure (Filling with high quality concrete is required.)
- Slope and Foot (Protection works by gabion is required.)

3.5 Inspection, Maintenance and Operation of Sluice Gate

One drainage sluice gate passing under the separating dike will be constructed at the downstream end of each retarding basin. In addition, sediment trap gate with sluice may be installed for removal of excessive sediment and adjustment of water level of the community pond.

As for drainage sluice, the type of gate to be installed shall be the flap gate type which can be automatically operated by water pressure. On the other hand, the gate attached to the sediment trap gate, if any, is the vertical slide type that can be manually operated. For these structures, painting shall be made every three years, at least, to protect the gates from rust. Weeds and sediment could easily accumulate on the bottom of the culvert. They shall be investigated by routine inspection and removed through routine maintenance.

3.5.1 Inspection

The principal items for inspection are as enumerated below:

- Rust and detached paint.
- Garbage, sediment and other drift materials at gate and sluiceway.
- Loose or missing bolts and nuts.
- Leaks on gate guide and sill portion.
- Cracks of concrete structure portion.
- Deformation of gate leaf, hoist and gate frame.

3.5.2 Maintenance

The principal items for maintenance are as enumerated below:

- Lubrication, greasing and painting of gate and other metal portions.
- Removal of garbage, sand, gravel and other drift materials accumulated in the culvert.
- Tightening or replacement of bolts and nuts.
- Filling of cracks and leaks with high quality concrete or other proper materials.

- Repair or replacement of conduits.
- Replacement and/or reconstruction of the gate leaf, gate hoist or other mechanical parts based on detailed investigation and design.

3.5.3 Operation

In terms of gate type, it is not necessary to operate the flap gate installed on the drainage sluice. On the other hand, the sluice gate shall be operated to sustain/release water in the pond playing the role as sedimentation trap area. Therefore, there is no gate to be operated in the event of flood. All of the gates will be closed in normal weather condition.

3.6 Operation in Flood Events and Normal Condition

Retarding basins provide people with a place for recreation and relaxation, and play the role as community space in normal weather condition. On the other hand, they impound floodwater during flood events, which is the main purpose of these facilities.

3.6.1 Activity in Normal Condition

The personnel assigned shall inspect the retarding basins once a month or more to check the following conditions, and record and report the results by filling out the designated record sheets:

- Existence of Residence in/around Retarding Basin: In case residence in/around the retarding basin area is found, such residence shall be reported to the FMC and prompt notification of eviction shall be made.
- Confirmation of Utilization of Retarding Basin: In case impermissible or unacceptable activities, utilization and installation of facilities/equipment in/around the retarding basin area are found, they shall be reported to the FMC. The FMC shall deal with such activities with dispatch in coordination with the stakeholders concerned.
- Modification of Shape of Facilities: In case unforgivable modifications of facilities in/around the retarding basin area are confirmed, they shall be reported to the FMC. The FMC shall deal with such activities with dispatch in coordination with the stakeholders concerned.
- Existence of New Facilities without Permission: In case buildings and structures which are not permitted are found, a removal and demolition program shall be prepared as soon as possible in coordination with the Barangay and Community concerned. The program shall also be implemented, promptly.

As the main administrative agency, the Municipal Government of Imus shall prepare/update the list/inventory of facilities and the list/inventory of amenity and recreational facilities and equipment once a year in each retarding basin. The annual O&M program for the retarding basins shall be prepared based on these lists/inventories and submitted to the FMC, which will finalize the proposed annual O&M programs in coordination with the agencies concerned. In case a community or barangay applies for the installation of additional facilities or the modification of existing facilities in/around the retarding basins and such application is found in order, the Municipal Government of Imus will issue a usage permit, which shall be coursed through the FMC for final approval as the top decision-making agency.

3.6.2 Activity Required in Normal Condition

Some mechanical facilities may be installed in the retarding basin, such as vertically sliding movable gate at the outlet of sediment trap or community pond. In normal weather condition, these mechanical facilities shall not be operated unless required. In this connection, such required operation shall be reported to the FMC to obtain prior approval, together with the monthly report, if necessary.

3.6.3 Activity during Flood Events

The personnel assigned (inspector) shall inspect the retarding basin during typhoon or continuous heavy rainfall to check the following conditions, and record and report the results by filling out the designated record sheets after flood events.

- Overflow Condition and Confirmation of Harmless Flow: Inspector(s) shall measure/record the water level at both the river channel side and the retarding basin side of the overflow dike section during flood events. In addition, the harmless flow and storage conditions shall be confirmed, and it is desirable to do such measurement and confirmation activities frequently as needed. However, it is virtually impossible for the Municipal Government of Imus to assign its limited number of permanent personnel as inspector(s) during flood events. Due to the circumstances, the municipal government should entrust the inspection to barangay residents on the premise that the activities will be made in accordance with the instruction and with the supervision of the municipal government.
- Advice to Evacuate from Retarding Basin with the Coordination of Barangay and NGOs: Notwithstanding heavy rainfall, some people may continue enjoying the recreational facilities in the retarding basin. Although the retarding basin is basically designed under the concept of safety first against inflow and storage of floodwater, turbulent flow will take place on/around the overflow dikes with stilling basin and drainage sluice. In this connection, the inspector(s) should advise people in the retarding basin to evacuate and/or avoid going into the retarding basin area. With regard to this operational activity, it is also important for the inspector(s) to disseminate information to the residents in advance through the daily activity of concerned personnel as well as all the agencies, communities and NGOs involved in the activity.

Appendix 3
Support on Land Use Control

Appendix 3-1

Draft Ordinance for "On-Site Flood Regulation Pond Requirement in a Development Project"

Republic of the Philippines
PROVINCE OF CAVITE
SANGGUNIANG PANLALAWIGAN

PROVINCIAL ORDINANCE NO. _____
Series of 2008

SECTION 1.0 TITLE

This ordinance shall be known as "On-Site Flood Regulation Pond Requirement in a Development Project".

SECTION 2.0 DECLARATION OF POLICIES

The Provincial Government of Cavite enforces this Ordinance in order to restrain the increment of peak flood run-off discharge brought about by the construction of new development projects to reduce flood damages in the lowland areas.

SECTION 3.0 DEFINITION OF TERMS

3.1 On-Site Flood Regulation Pond

"On-site Flood Regulation Pond" is a facility, which temporarily collects and retains storm rainfall water in the new development project so as to reduce the peak-run-off discharge toward the lower reaches.

3.2 Development Project

3.2.1 Residential Subdivision Project under BP-220 and PD-957

"Residential Subdivision Project" shall mean a tract of a parcel of land registered under Republic Act No. 496 which is partitioned primarily for residential purposes into individual lots with or without improvements thereon, and offered to the public for sale, in cash or in installment term.

3.2.2 Other Project

"Other Development Project" shall mean any development project which may or may not require subdivision. The development projects include shopping malls and commercial development, and industrial estate development.

SECTION 4.0 SCOPE OF APPLICATION

This ordinance shall be applied to all new development projects which have a total area of five (5) hectares or larger within the administrative boundary of the Province of Cavite.

When a total area of the development project is less than five (5) hectare, the Flood Impact Fee stipulated in Section 10 shall be applied.

SECTION 5.0 ADMINISTRATION

5.1 Design and Construction of On-site Flood Regulation Pond

The On-Site Flood Regulation Pond shall be designed and constructed by the developer of the new development project based on Apeendix-1 of a part of this ordinance.

5.2 Approval of Design of On-Site Flood Regulation Pond

The design of the On-Site Flood Regulation Pond shall be reviewed by a licensed engineer and approved within the procedure of subdivision permit or building permit. The approval procedure shall be reviewed in accordance with the city or municipal development permit procedure.

5.3 Fees

The concerned city/municipality shall set and collect appropriate fees for review and initial inspection. It is deemed that the fee for review and initial inspection fees for application are included in the fee of development permission.

5.4 Maintenance of On-site Flood Regulation Pond

The On-Site Regulation Pond shall be incorporated to the landscape of development in a way to promote maintenance of the ponds. The maintenance work shall be conducted regularly by the owner, the homeowners' association and LGU to ensure the functions of the pond.

SECTION 6.0 MINIMUM DESIGN REQUIREMENTS

6.1 Size

6.1.a Subdivision Project

The On-Site Regulation Ponds shall have an area equal to or larger than three (3) percent of a total area of development project.

For subdivision project under PD957 and BP220, the allocation of land may be inclusive of the required minimum open space of 30% of a new subdivision project stipulated in PD957. When a part or all functions of basic utilities and other community facilities/services do not satisfy the standards because of the allocation of the On-Site Regulation Pond, the developer shall provide an additional area in addition to the 30% open space requirement within the area of subdivision project. The developer may exclude the three-percent (3%) obligation for the On-Site Regulation Ponds and treat as the Excluded Area.

6.1.b Other Development Project

6.2 As for other development project (3.2.b), the On-Site Regulation Ponds shall have an area equal to or larger than three (3) percent of a total area of development project.

The On-Site Regulation Ponds shall be located at the lowest elevation points at the ends of natural drainage directions. (c.f. Appendix 2, 3)

6.3 Flow Regulation

Flow from the On-Site Regulation Ponds shall be directed to the available storm water facilities or appropriate water bodies.

6.4 Required Documents

The developer shall submit to the authorities concerned of the city/municipality the required copies of the following documents for prior approval (refer to "REFERENCE FOR DESIGNING OF ON-SITE FLOOD REGULATION POND" attached to this Ordinance.):

- Plan and longitudinal profile of the entire structure with a scale of 1/500 or larger
- Plan and longitudinal profile of the outlet structure with a scale of 1/500 or larger
- Front view of outlet structure with a scale of 1/100 or larger
- Plan and longitudinal profile of the spillway with a scale of 1/500 or larger
- Front view of spillway with a scale of 1/100 or larger.

SECTION 7.0 MULTIPLE USE OF ON-SITE FLOOD REGULATION POND

The space of the pond is to be used to store the flood run-off discharge during the time of rainfall. However, it could be used as amenity space such as park and sports ground during the time of non-rainfall, and the movable facilities such as goal post and sports net, which would not hamper the storage of flood run-off discharge, could be placed in the place of the pond.

SECTION 8.0 SANITARY TREATMENT

The On-Site Regulation Pond is to be constructed within the compound of the development project, and it should not cause any environmental deterioration in and around the pond. From this view point, drainpipes for household waste and other sanitary sewage pipes shall not be connected to the pond. Regular inspection and maintenance shall also be made to prevent dumping of garbage into the pond.

SECTION 9.0 SAFETY

For the safety reasons, a licensed engineer of city/municipality may require fences or blocking devices including hedges. When it is required, the developer shall design such blocking devices while securing visibility to the On-site Flood Regulation Pond and the aesthetic values of the properties.

SECTION 10.0 FLOOD IMPACT FEE AND ESTABLISHMENT OF SUBSIDY FUND

10.1 Collection of Impact Fees

When a total area of new development project is less than five (5) hectares, the developer shall pay PHP one million per hectare of the total project area.

The cities and municipalities shall collect the Flood Impact Fees from the developer in the process of development application.

10.2 Creation of the BP220 On-Site Flood Regulation Pond Construction Subsidy Fund

The fees collected shall be managed by the Provincial Treasury as the BP220 On-Site Flood Regulation Pond Construction Subsidy Fund. The fund shall be used only to subsidize the construction cost of the on-site flood regulation pond in a BP220 subdivision project which has a total area of five (5) hectare or larger.

10.3 Exemption

The subdivision project which is classified as BP220 and has a total area smaller than five (5) hectares shall be exempt from the Flood Impact Fee.

SECTION 11.0 SUBSIDY APPLICATION AND PAYMENT

The developer of BP220 subdivision with a total area of five (5) hectare or larger may apply for the BP220 On-Site Flood Regulation Pond Subsidy to the Provincial Government. The amount of subsidy to BP220 project shall be PHP one million per one hectare of development. The Provincial Government shall pay the amount proportional to the total project areas to the developer after completion and inspection of the on-site flood regulation pond. When the Fund is not sufficient to cover the amount, the Provincial Government shall pay from the general account of the province.

SECTION 12.0 DONATION OF ON-SITE FLOOD REGULATION POND

The owner or project developer shall donate the on-site flood regulation pond in the development project to the duly accredited homeowners association.

SECTION 13.0 EFFECTIVITY

This Ordinance shall take effect (number of days) after its publication in (a daily newspaper of wide circulation).

Unanimously approved:

DENCITO P. CAMPAÑA
Vice Governor/Presiding Officer

RECTO M. CANTIMBUHAN
Sanggunian Member

RAYMUNDO A. DEL ROSARIO
Sanggunian Member

CESARIO R. DEL ROSARIO, JR.
Sanggunian Member

ALEX L. ADVINCULA
Sanggunian Member

RESTITUTO T. ENRIQUEZ
Sanggunian Member

ARLENE C. ARAYATA
Sanggunian Member

EILEEN R. BERATIO
Sanggunian Member

VIRGILIO T. AMBION
Sanggunian Member

LOPE D. TEPORA
Sanggunian Member

LUIS T. PAGTAKHAN
Sanggunian Member

REMIGIO G. DILAG
SB Prov'l Fed., President

CECILIA D. MIRANDA
ABC Prov's Fed. President

JUAN MIGUEL C. ILANO
SK Prov'l President

ATTESTED:

JOSE R. DE CASTRO, SR.
Provincial Board Secretary

APPROVED:

AYONG S. MALIKSI
Provincial Governor

ANNEX 1 **REFERENCE FOR DESIGN OF ON-SITE FLOOD REGULATION POND**

ANNEX 2 **EXAMPLE OF DESIGN FOR ON-SITE FLOOD REGULATION POND IN THE SUBDIVISION OF FIVE HECTARES**

ANNEX 3 **EXAMPLE OF DESIGN FOR ON-SITE FLOOD REGULATION POND IN THE SUBDIVISION OF ONE HUNDRED HECTARE**

ANNEX 1

REFERENCE FOR DESIGNING AN ON-SITE FLOOD REGULATION POND

Article 1 Application

This document shall be used as reference for designing on-site flood regulation ponds, which have to be constructed within the premises of new subdivisions containing an area of five (5) hectares or larger.

Article 2 Principal Objective of On-site Flood Regulation Pond

The principal objective of the on-site flood regulation pond is to offset the increment of peak flood runoff discharge caused by coverings such as road pavements, roofs of houses and other impermeable structures to be constructed within the premises of the new subdivision.

Article 3 Design Scale of On-site Flood Regulation Pond

The on-site flood regulation pond shall have the capacity to achieve the objective described in Article 2 above against the probable runoff discharge of 20-year or shorter return period.

Article 4 Structural Components of On-site Flood Retarding Pond

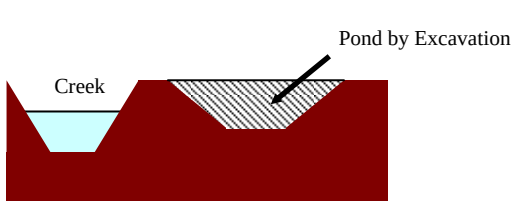
The on-site flood regulation pond could be divided into three major components; namely, (1) the pond; (2) the outlet structure; and (3) the spillway. Detailed structural features of these structures are as described in the following Articles.

Article 5 Maximum Extent and Depth of On-site Flood Regulation Pond

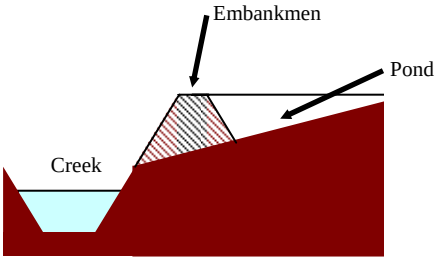
The allowable maximum extent and depth of the on-site flood regulation pond shall be three percent (3%) of the entire area of the subdivision and 7.1 meters, respectively (refer to Article 9).

Article 6 Types of the Pond

The pond shall be constructed by excavation of the ground or by embankment of soil on the existing ground according to the topographic conditions, as illustrated below.



Pond by Excavation



Pond by Embankment

Fig. 1 Type of Pond

Article 7 Foundation Treatment for Embankment

(1) Boring Test Required at the Site of Embankment

When pond by embankment as specified in Article 6 is constructed, boring test shall be made at the right/left edge and the center of the embankment in order to confirm whether or not poor and/or pervious ground exists below the site of the embankment (refer to Fig. 2). Depth of boring test shall be more than three times of the height of embankment. Poor ground and pervious ground are herein defined, as shown in Table 1:

Table 1 Definition of Poor Ground and Pervious Ground

Description	Definition
Poor Ground	Cohesive soil and/or organic soil with N-values of less than 6, or Sandy soil with N-values of less than 15
Pervious Ground	Sandy soil or gravel soil with the hydraulic conductivity of more than 10^{-5}cm/sec

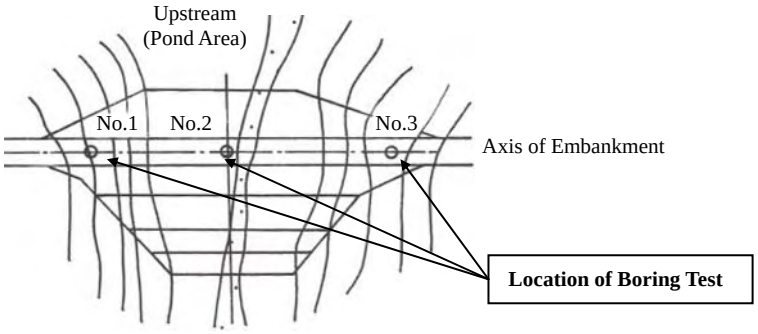


Fig. 2 Locations of Boring Test at the Site of Embankment

(2) Foundation Treatment for Poor Ground at the Site of Embankment

When poor ground as defined in Table 1 is detected at the site of embankment through the boring test, the proper treatment method such as replacement of foundation, mixing method, and soil compaction method shall be adopted based on the advice and/or instruction of the properly designated and qualified engineer of the District Office of DPWH in Trece Martires City or the Provincial Engineering Office of Cavite Province.

(3) Foundation Treatment for Pervious Ground at the Site of Embankment

When the pervious ground as defined in Table R 1 is detected at the site of embankment through the boring test, the proper treatment method shall be adopted based on the advice and/or instruction by the qualified engineer of the District Office of DPWH in Trece Martires or the Provincial Engineering Office of Cavite. The treatment would include the following shield wall method and blanketing method.

(a) Shield Wall Method

The shield wall made of sheet pile, clay or other impermeable material has to be constructed at the pervious ground as illustrated below.

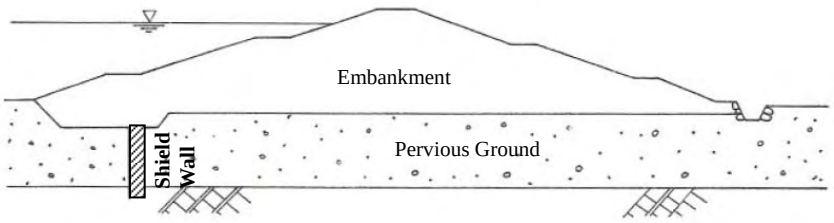


Fig. 3 Shield Wall Method

(b) Blanketing Method

The bottom of the pond has to be covered with impermeable material such as mortar and clay to prevent penetration of water into the foundation.

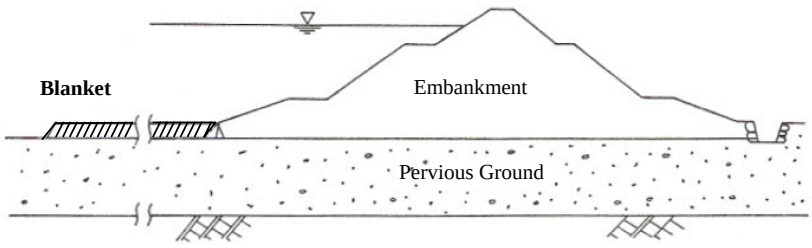


Fig. 4 Blanketing Method

Article 8 Slopes of the Pond

The slopes of the ponds for the above two types shall be designed, as described below:

(1) Slopes of the Pond by Excavation:

- The slopes shall be 1 to 2.0 and protected by sodding works or block lining.
- Slopes protected by wet masonry pitching and/or concrete plastering work could be set at 1 to 0.5 as the steepest.
- Every step of cut or embankment shall be less than 2.0m in height.

(2) Slopes of the Pond by Embankment

The followings are applicable as the materials and slopes for the embankment on the premises of sodding works or block lining.

Table 2 Applicable Materials and Slopes for Embankment

Applicable Material			Slope	
Soil Classification	Name of Soil	Symbol*	Upstream	Downstream
Coarse-grained Soil	Gravel Soil	(GM) (GC) (GO) (GV)	1 to 3.0	1 to 2.5
	Sandy Soil	(SM) (SC) (SO) (SV)	1 to 3.0	1 to 2.5
Fine grained Soil	Silt/ Cohesive soil	(ML) (CL)	1 to 3.5	1 to 3.0
	Volcanic ash cohesive soil	(MH) (CH) (OV) (VH) (VH_2)	1 to 3.0	1 to 2.5

*: Defined in AASHTO Soil Classification System

Article 9 Structural Dimensions of the Pond

The pond contains three design water levels; namely, the “Low Water Level (LWL)”, the “Surcharge Water Level (LWL)” and the “Design Water Level (DWL)”, and the design storage capacities called as “Storage Capacity for Sedimentation (Vs)” and “Active Storage Capacity (Vs)” as shown in Fig. 5 and Table 3. The detailed specifications of these design water levels and storage capacities are further described in items (1) to (4) below.

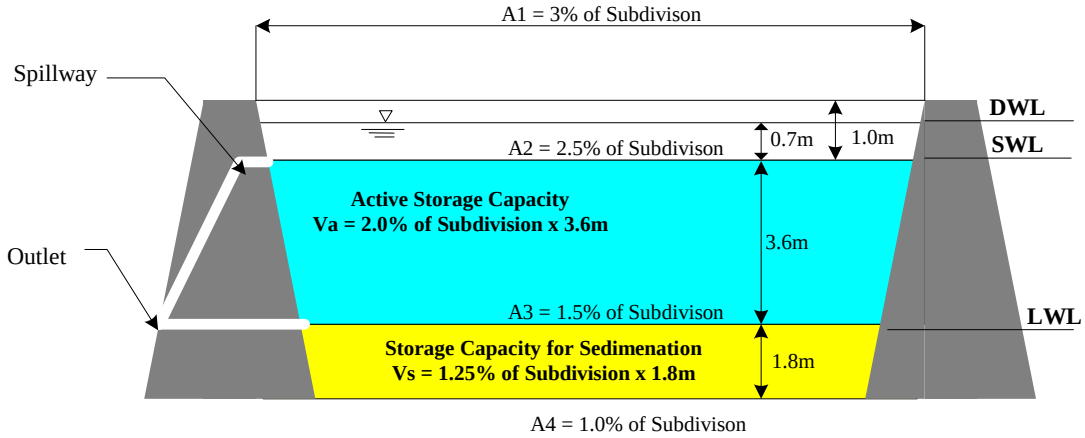


Fig. 5 Design Water Levels and Storage Capacities of On-site Flood Regulation Pond

Table 3 Standard Design of Pond

Description	Specification	Structural Dimensions	
		Subdivision (5ha)	Subdivision (100ha)
Design Water Level (DWL)	0.3m below the surrounding ground level	G.L. –0.3m*	G.L. –0.3m*
Surcharge Water Level (SWL)	0.7m below DWL	G.L. –1.0m*	G.L. –1.0m*
Low Water Level (LWL)	3.0m below SWL	G.L. –4.0m*	G.L. –4.0m*
Bottom Elev. of Pond	1.8m below LWL	G.L. –6.4m*	G.L. –6.4m*
Entire Area of Construction Site	3.0% of Subdivision	1,500m^2	30,000m^2
Area of Pond Surface at SWL	2.5% of Subdivision	1,250m^2	25,000m^2
Area of Pond Surface at LWL	1.5% of Subdivision	750m^2	15,000m^2
Area of Bottom of Pond	1.0% of Subdivision	500m^2	10,000m^2
Active Storage Capacity	(2.0% of Subdivision) x 3.6m	3,600m^3	72,000m^3
Storage Capacity for Sediment	(1.25% of Subdivision) x 1.8m**	1,125m^3	22,500m^3

*: The relative elevation from the ground level around the pond.
**: Estimated from the Formula (1) below, assuming 2 years as the period of land development (N)

(1) Storage Capacity for Sedimentation (Vs) and Low Water Level (LWL)

The Storage Capacity for Sedimentation (Vs) shall be placed at the bottom of the pond, and the Low Water Level (LWL) at the top elevation of the Vs. The Vs aims at trapping the sediment runoff from the development site of subdivision. The "Technical Criteria for On-site Flood Regulation Pond in Japan"* estimated, based on the results of the actual field measurement, that the development of the subdivision causes the sediment runoff of 70 to 240m^3/year/ha in the first one-year and recommends 150m^3/year/ha as the standard volume. The Criteria further assumes that the annual sediment runoff volume is reduced in half every year. Based on the above concepts of the Technical Criteria, the storage capacity for sedimentation shall be estimated through the following Formula (1):

$$Vs = Rs \times \sum_{i=0}^{N-1} (1/2)^i \times A_{whole} \quad \text{.....(1)}$$

Where;

Vs: Design Storage Capacity for Sedimentation
Rs: Standard annual specific sediment runoff volume in the initial year of land development for the subdivision (assumed at 150m3/year/ha)
N: Period of land development (year)
Awhole: The whole extent of Subdivision (ha)

(2) Active Storage Capacity (Va) and Surcharge Water Level (SWL)

This Active Storage Capacity (Va) shall be placed above the Storage Capacity for Sedimentation (Vs) and the Surcharge Water Level (SWL) at the top elevation of the Va.

The Va functions to temporarily store the flood runoff discharges of 20 year return period or less and gradually release them downstream through the outlet structure. This capacity functions to offset the increment of peak runoff discharge caused by development of the subdivision. The design storage capacity shall be estimated through the following Formula:

$$Va = A_{whole} \times 2\% \times 3.8m \quad \text{.....(2)}$$

Where;

Va: Design Active Storage Capacity
A_{whole}: The whole extent of Subdivision (ha)

(3) Design Water Level (DWL)

The probable peak flood runoff discharge of 100-year return period multiplied by 1.2 is assumed as the "probable maximum inflow discharge" to the pond. The spillway shall be designed to

* Draft of Technical Criteria for Flood Regulation Pond and other On-site Flood Detention Facilities, Explanation and Design Examples; Japan River Association, 1987

spill the probable maximum inflow discharge, maintaining the pond water level at the Design Water Level (DWL), as described in Article 11. Thus, the DWL is defined as the probable highest water level of the pond. The pond water level reaches the DWL when the "probable maximum inflow discharge" occurs.

The DWL shall be set at 0.7m above SWL, and the crest of the on-site flood regulation pond at 0.3m above the DWL, taking the freeboard into account.

Article 10 Design of the Outlet Structure

The outlet structure shall be placed at the bottom of the pond to gradually drain the floodwater stored in the pond. The main components of the structure are the screen, the outlet hole, the air valve and the culvert. The structural dimensions of these structures are as shown in Table 4.

Table 4 Standard Design of Outlet Structure

Component	Specification	Structural Dimensions	
		Subdivision (5ha)	Subdivision (100ha)
Outlet	Shape: Rectangle Height: 0.3m Width: 0.04m/ha x {The whole extent of Subdivision} Bottom Elevation: LWL	Rectangle 0.30m 0.20m LWL	Rectangle 0.30m 4.00m LWL
Screen	Height: 1.65m (1.5m + 0.15m) Width: Width of outlet hole + 0.9m x 2 (Min. 2.0m) Bottom Elevation: 0.15m below LWL	1.65m 2.00m 0.15m below LWL	1.65m 5.80m 0.15m below LWL
Culvert	Shape: Rectangle Height: 0.75m Width: Width of outlet hole + 0.8m (Min. 1.0m) To be made of reinforced concrete	Rectangle 0.75m 1.00m	Rectangle 0.75m 4.80m

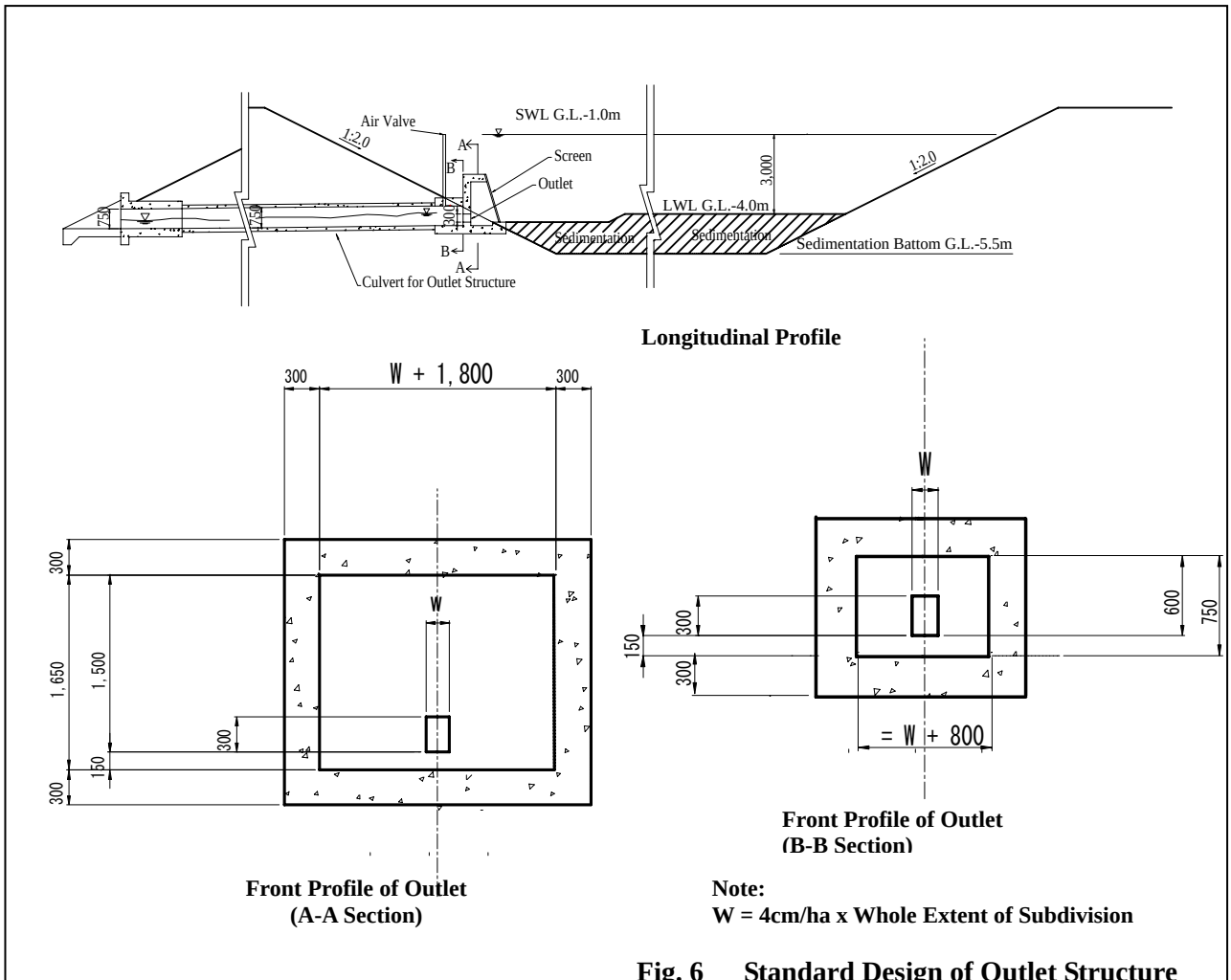


Fig. 6 Standard Design of Outlet Structure

Article 11 Design of Spillway

The spillway is the overflow waterway to spill the pond inflow discharge of 20-year return period or more. The spillway consists of the upstream waterway, the free overflow weir, and the downstream waterway, as shown in Fig. 3.

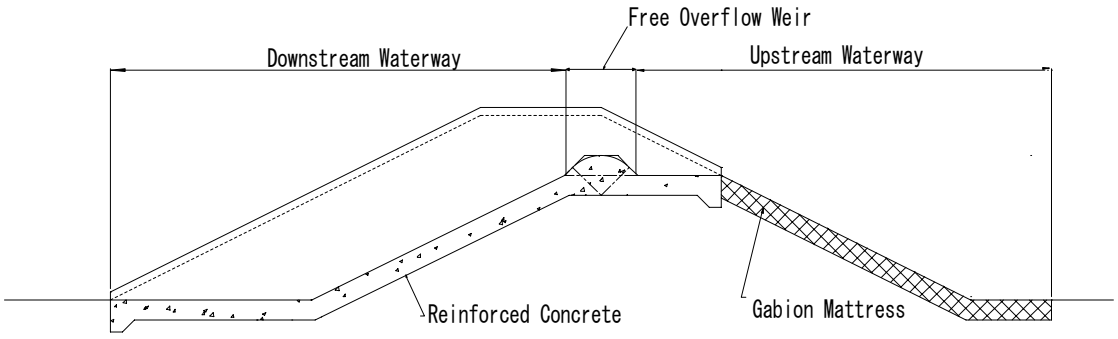


Fig. 7 Components of Spillway

Of the above structural components, the free overflow weir is placed at 0.50m below the SWL as shown in Fig. 3, and its width is determined to spill the probable maximum inflow discharge (= 1.2 times of the probable peak runoff discharge of 100-year return period), maintaining the pond water level equal to the DWL through the following Formula (3):

$$W = Q_{max} / (C \times H^{3/2}) \quad \text{.....(3)}$$

Where;

W: Width of Free Overflow Weir (m)

Q_{max}: The Probable Maximum Inflow Discharge (i.e., 1.2times of the Probable Peak Runoff Discharge of 100-year return period) (m^3/s)

C: Coefficient Discharge (Assumed at 1.8)

H: Approach Velocity Head (Assumed at 0.70m)

The Probable Maximum Inflow Discharge (Qmax) in the above Formula (3) has the particular relationship with the entire area of subdivision as shown in Table 3 and Fig. 4, and could be estimated through the following Formula (4):

$$Q_{max} = 0.2652 \times As + 0.5213 \quad \text{.....(4)}$$

Where;

Q_{max}: The Probable Maximum Inflow Discharge (i.e., 1.2times of the Probable Peak Runoff Discharge of 100-yaer return period) (m3/s)

As: Entire Area of Subdivision (ha)

Table 5 Relationship between Entire Area of Subdivision and Probable Maximum Inflow Discharge

As Entire Area of Subdivision (ha)	**$Q_{100year}$** Probable Peak Runoff Discharge of 100 Year Return Period (m^3/s)	**Q_{max}** (=Q100year x 1.2) Probable Maximum Inflow Discharge (m^3/s)
5	1.23	1.5
10	2.28	2.7
100	22.71	27.3
500	111.97	134.4
1000	220.93	265.1

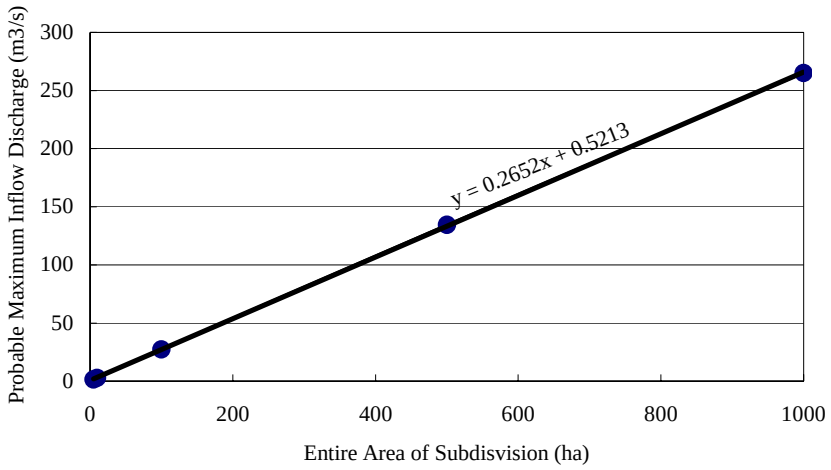
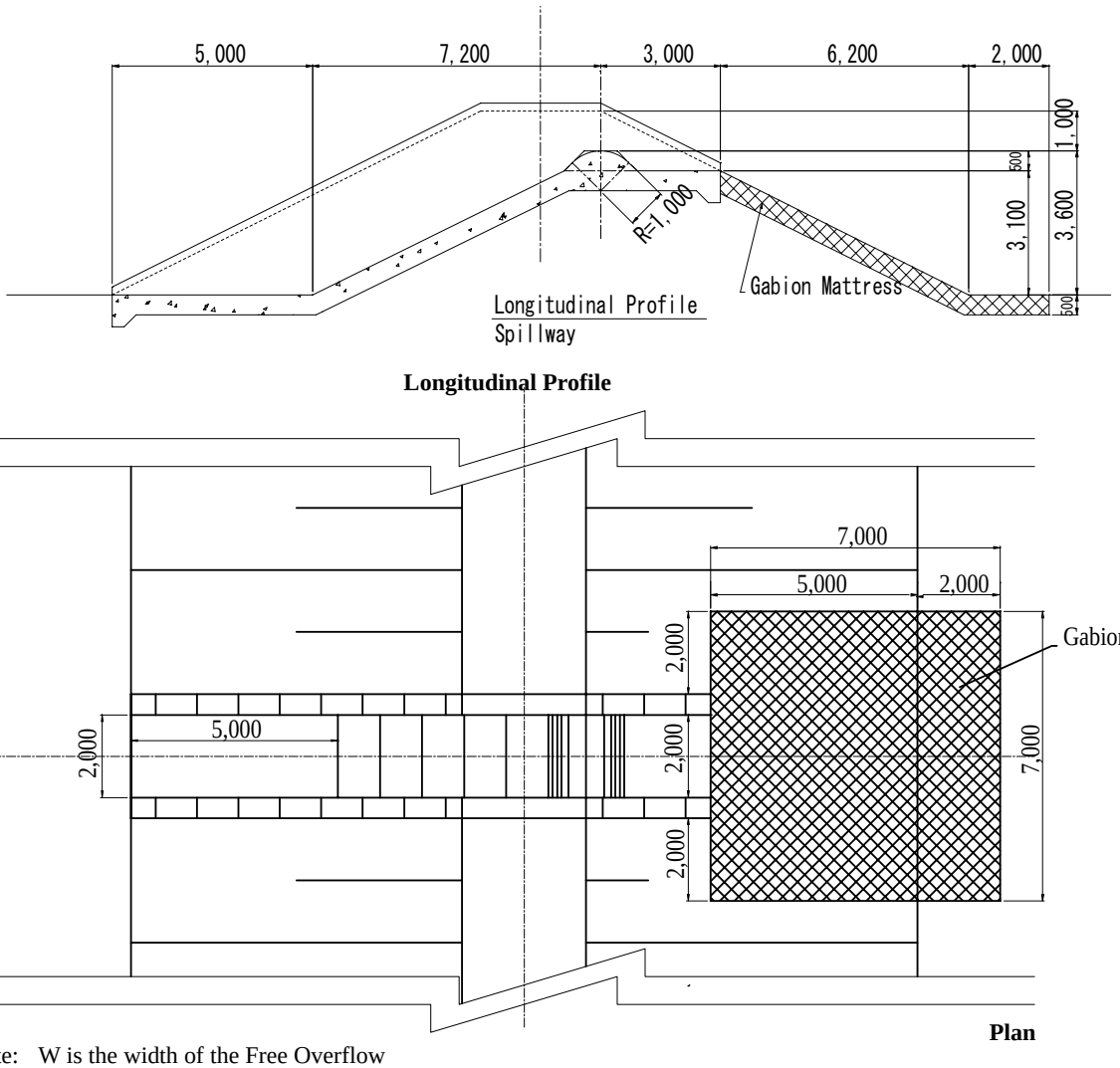


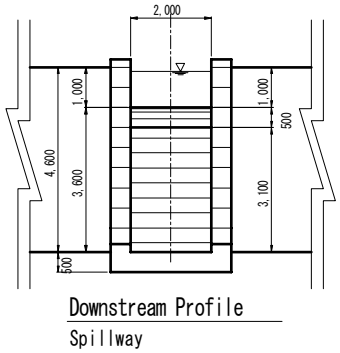
Fig. 8 Relationship between Entire Area of Subdivision and Probable Maximum Inflow Discharge

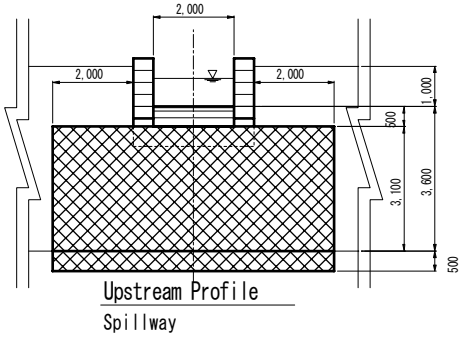
The standard design of each of the structural components of the spillway is to be delineated based on the width of the Free Overflow Weir shown in Fig. 5.



Note: W is the width of the Free Overflow Weir, which could be estimated through Formula (4)

Fig. 9 Standard Design of Spillway_1/2





Front View

Note: W is the width of the Free Overflow Weir, which could be estimated through Formula (4)

Fig. 10 Standard Design of Spillway_2/2

Article 12 Multiple Use of On-site Flood Regulation Pond

The space of the pond is for the storage of flood runoff discharge during the time of rainfall. However, it could be used as amenity space such as park and sports ground during the time of non-rainfall, and the movable facilities such as goal post and sports net, which would not hamper the storage of flood runoff discharge, could be placed in the space of the pond.

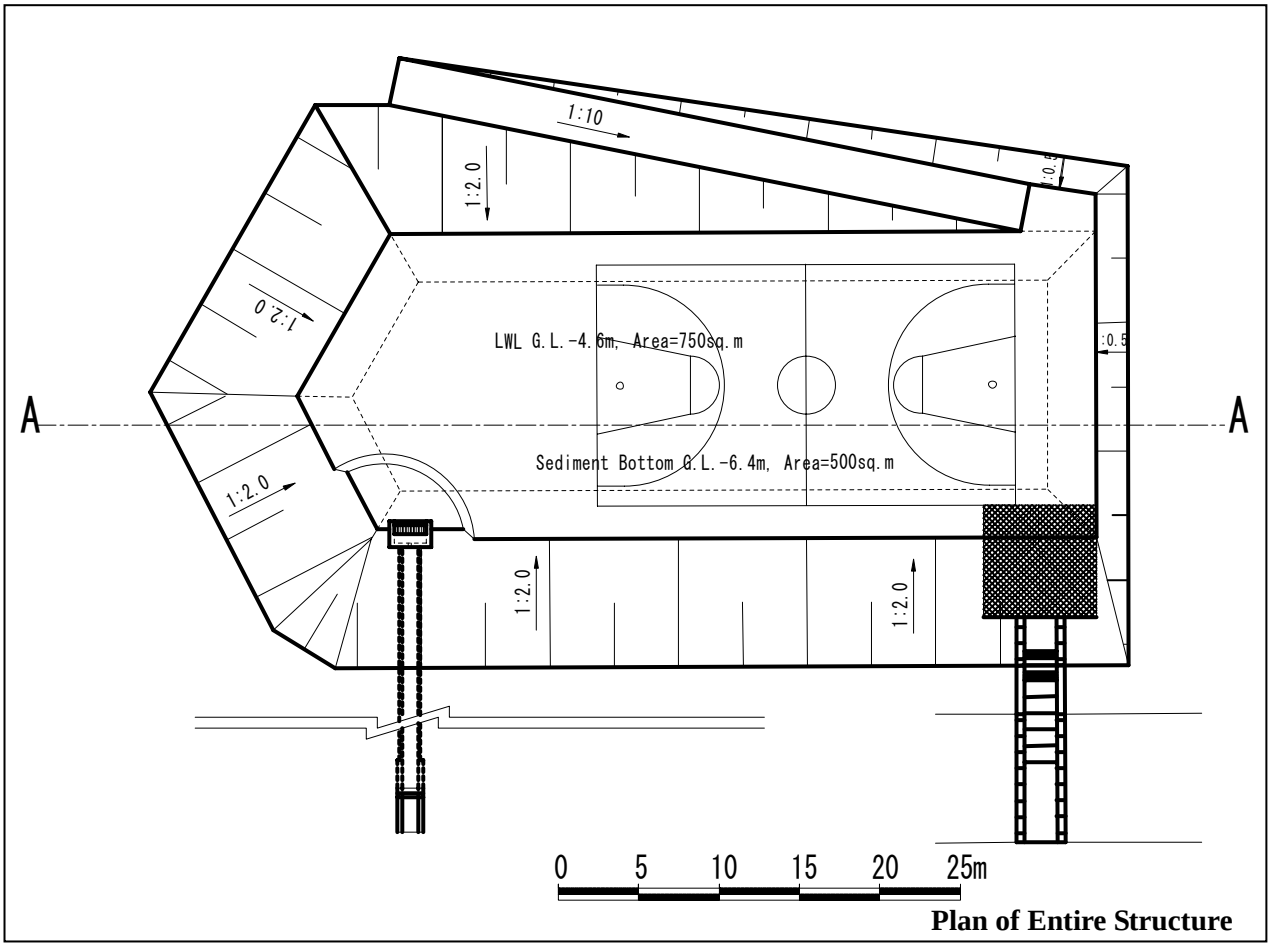
Article 13 Sanitary Treatment

The on-site flood regulation pond is to be constructed within the compound of the subdivision, and it should not cause any environmental deterioration in and around the pond. From this viewpoint, drainpipes for household waste and other sanitary sewage pipes should not be connected to the pond. Regular inspection and maintenance for the pond also shall be made to prevent the dumping of garbage or wastes into the pond.

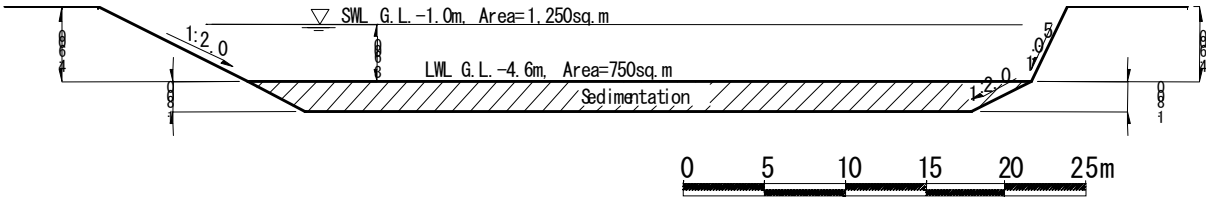
ANNEX 2

EXAMPLE OF DESIGN
FOR
ON-SITE FLOOD REGULATION POND
IN
THE SUBDIVISION OF FIVE HECTARES

Fig, 1 (1/3) Plan and Longitudinal Plan of Entire Structure for Subdivision of 5ha

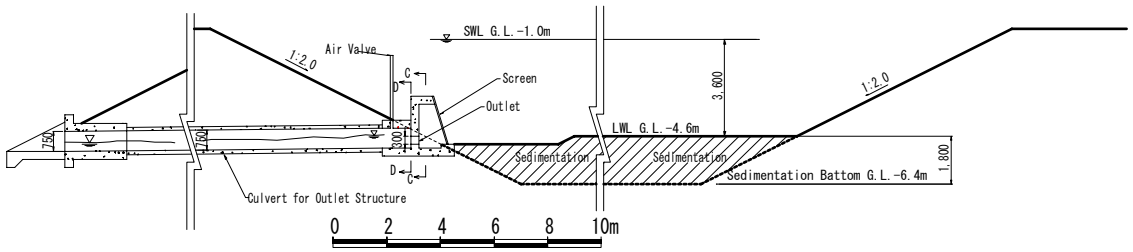


Plan of Entire Structure

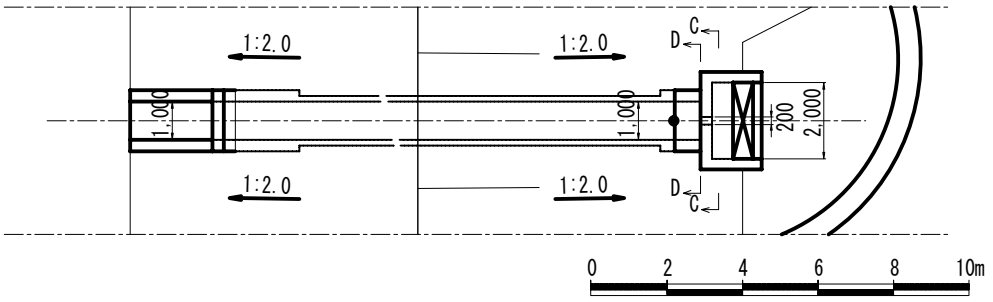


LONGITUDINAL PROFILE

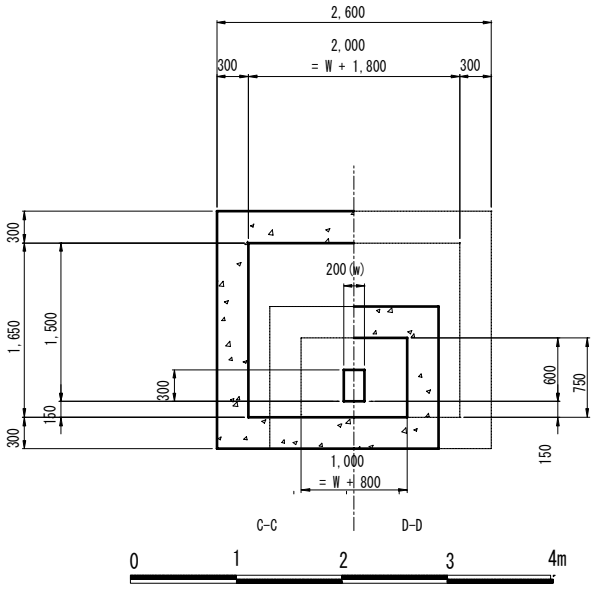
Fig, 1 (2/3) Details of Outlet Structure for Subdivision of 5ha



Longitudinal Profile of Outlet Structure

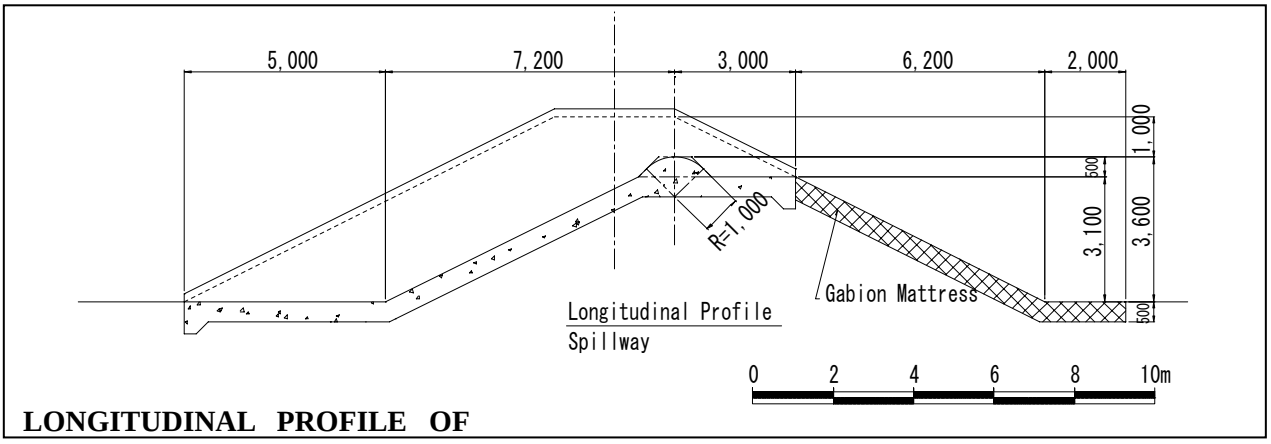


Plan of Outlet Structure

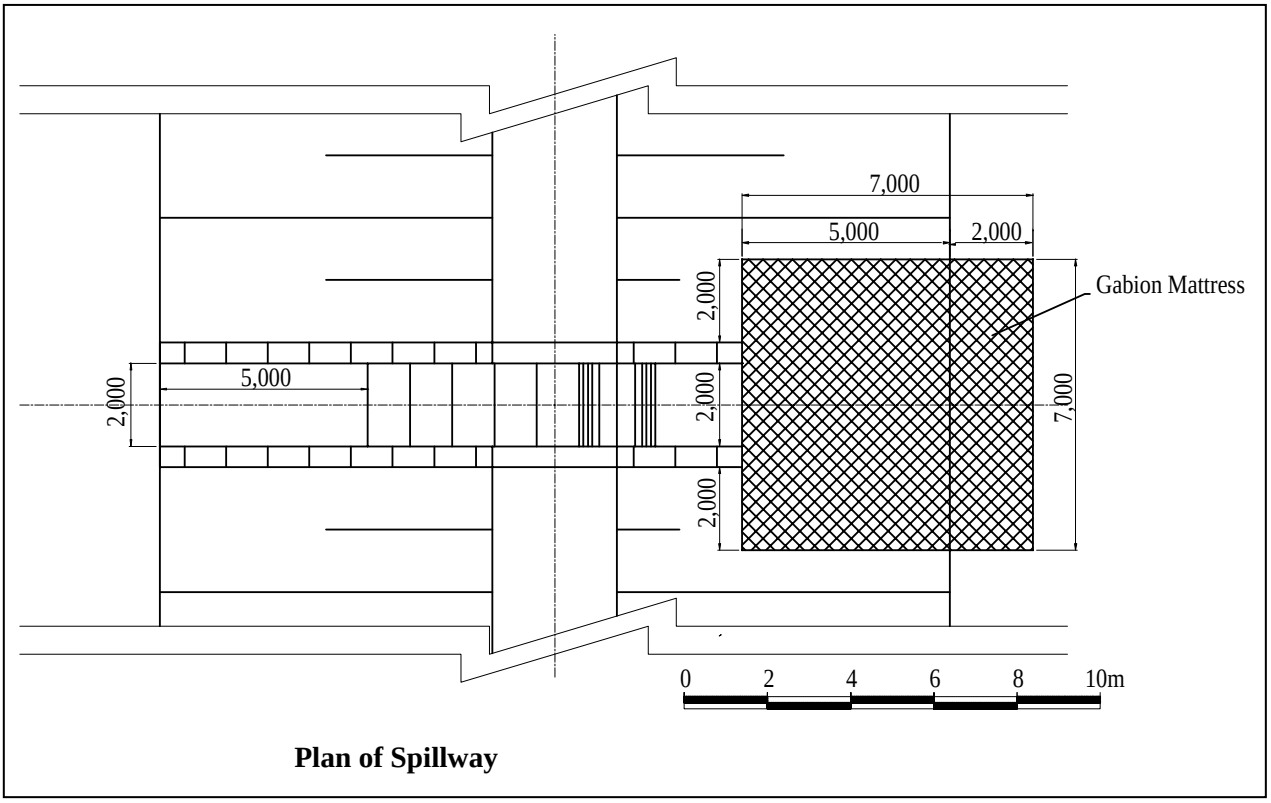


Front View of Outlet Structure (Section C-C & D-D)

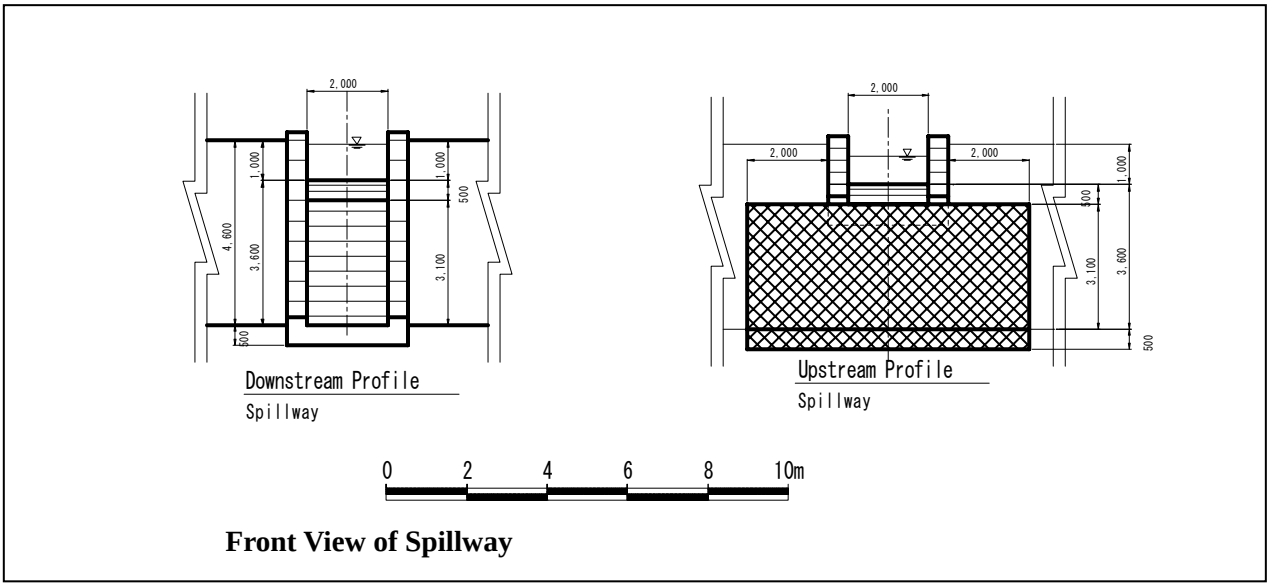
Fig, 1 (3/3) Details of Spillway Structure for Subdivision of 5ha



LONGITUDINAL PROFILE OF



Plan of Spillway

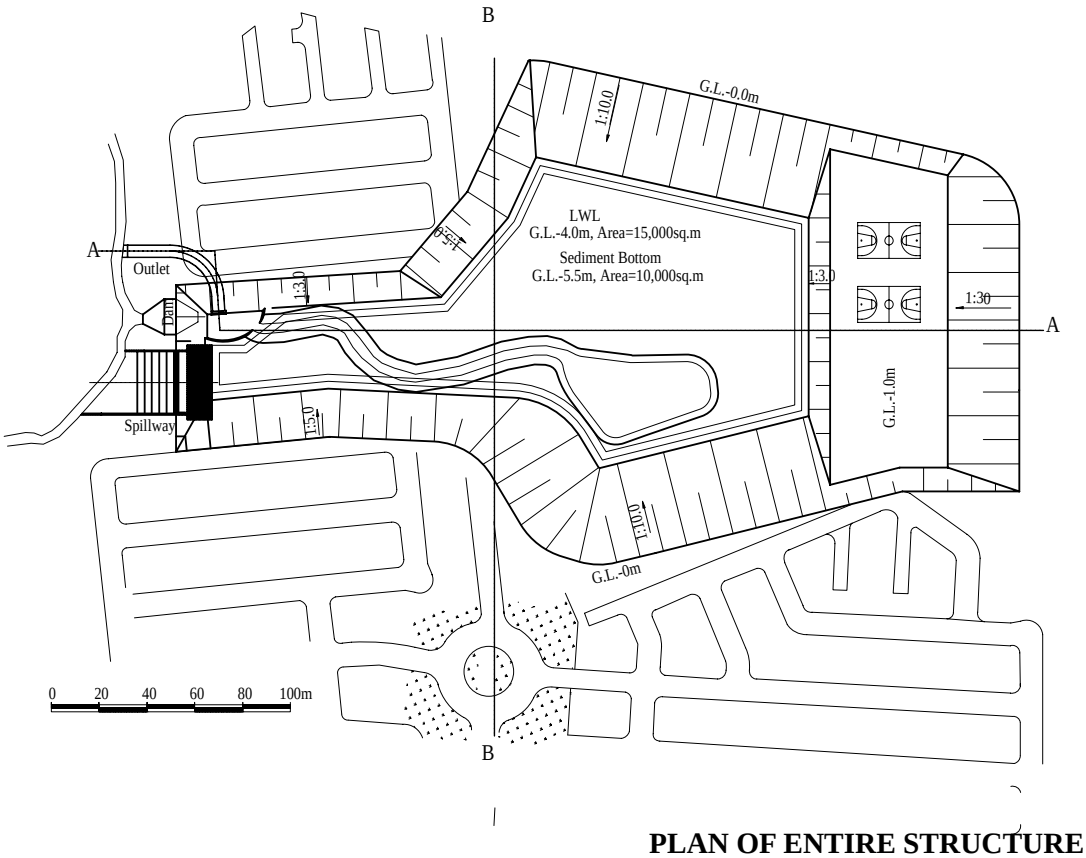


Front View of Spillway

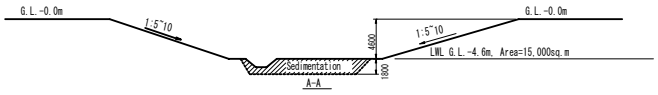
ANNEX 3

EXAMPLE OF DESIGN
FOR
ON-SITE FLOOD REGULATION POND
IN
THE SUBDIVISION OF ONE-HUNDRED HECTARES

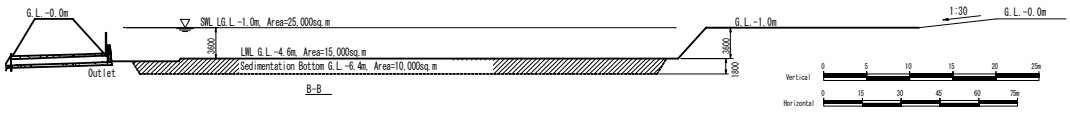
Fig, 2 (1/3) Plan and Longitudinal Profile of Entire Structure for Subdivision of 100ha



PLAN OF ENTIRE STRUCTURE



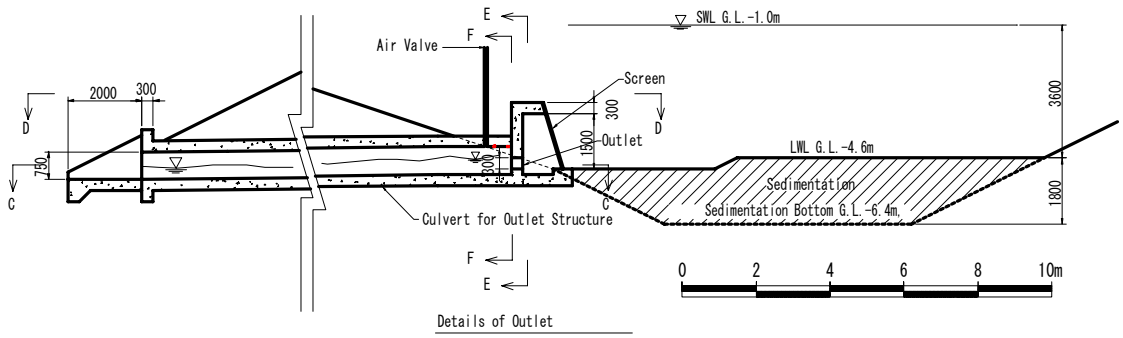
SECTION A-A



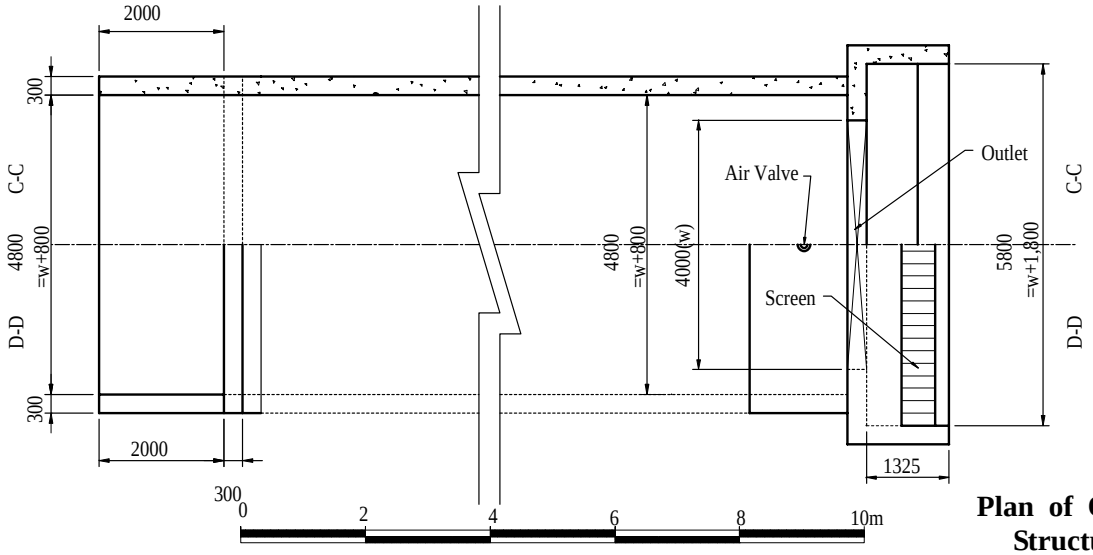
SECTION B-B

LONGITUDINAL

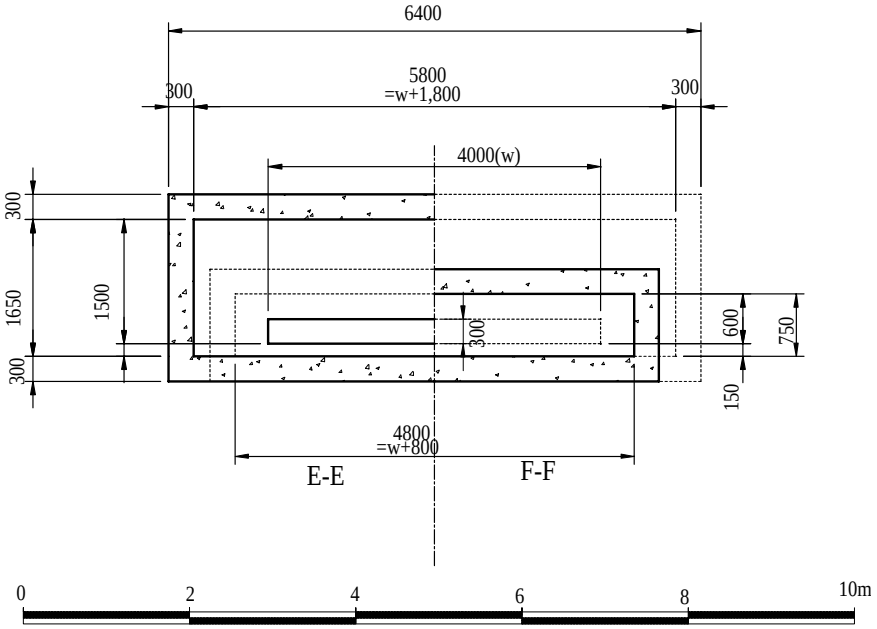
Fig, 2 (2/3) Outlet Structure for Subdivision of 100ha



Longitudinal Profile of Outlet Structure

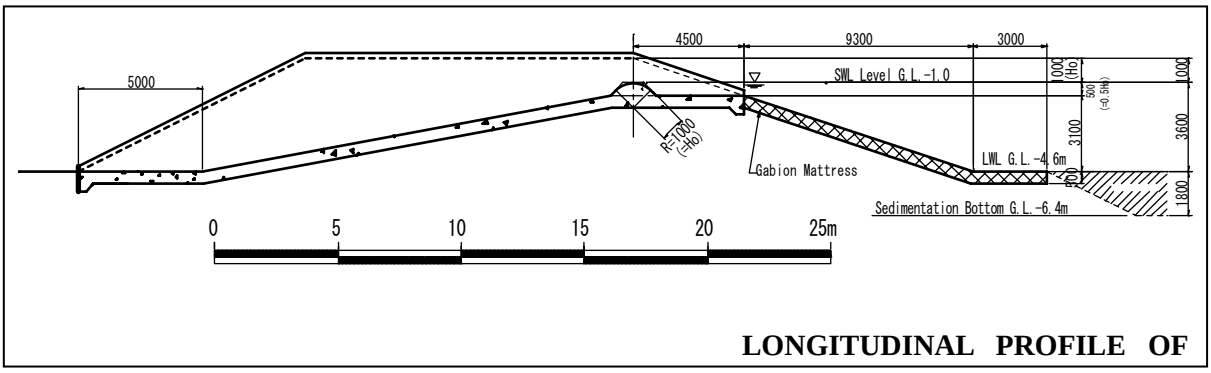


Plan of Outlet Structure

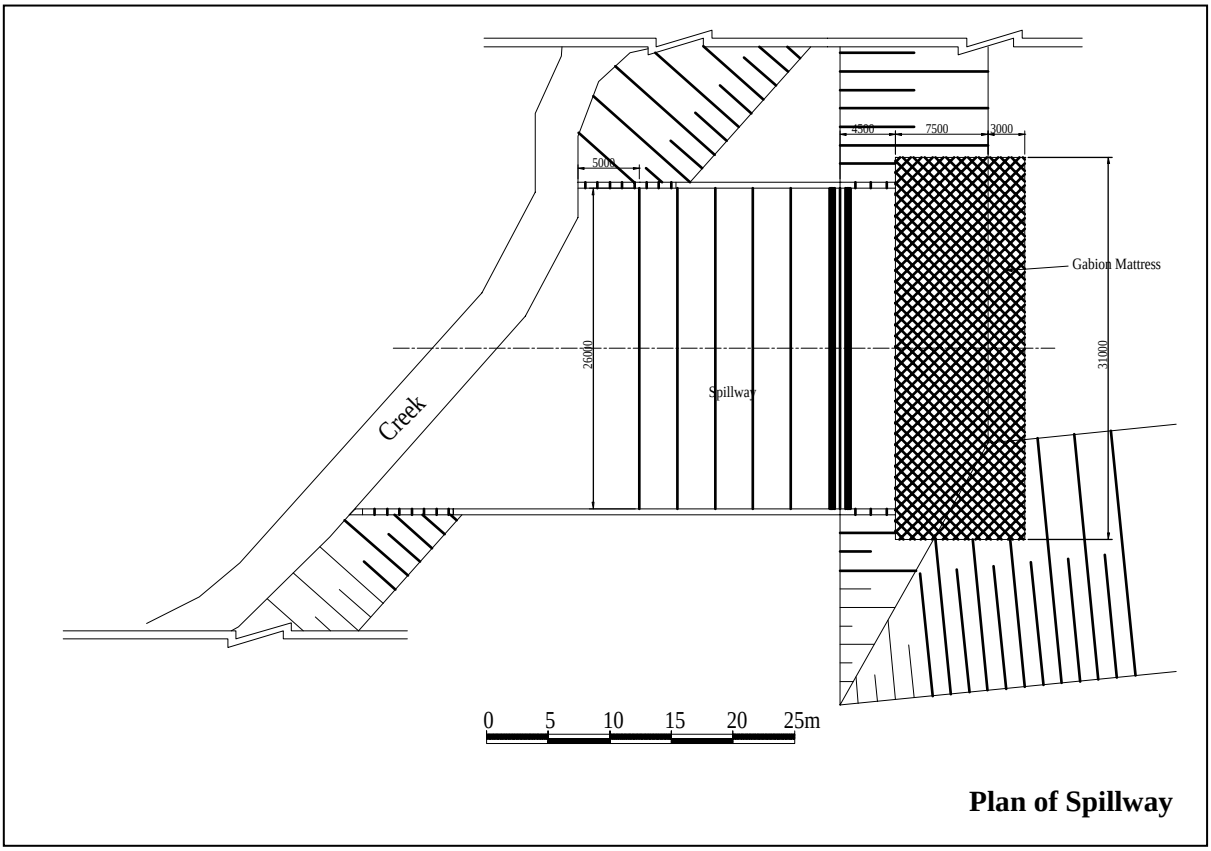


Front View of Outlet Structure

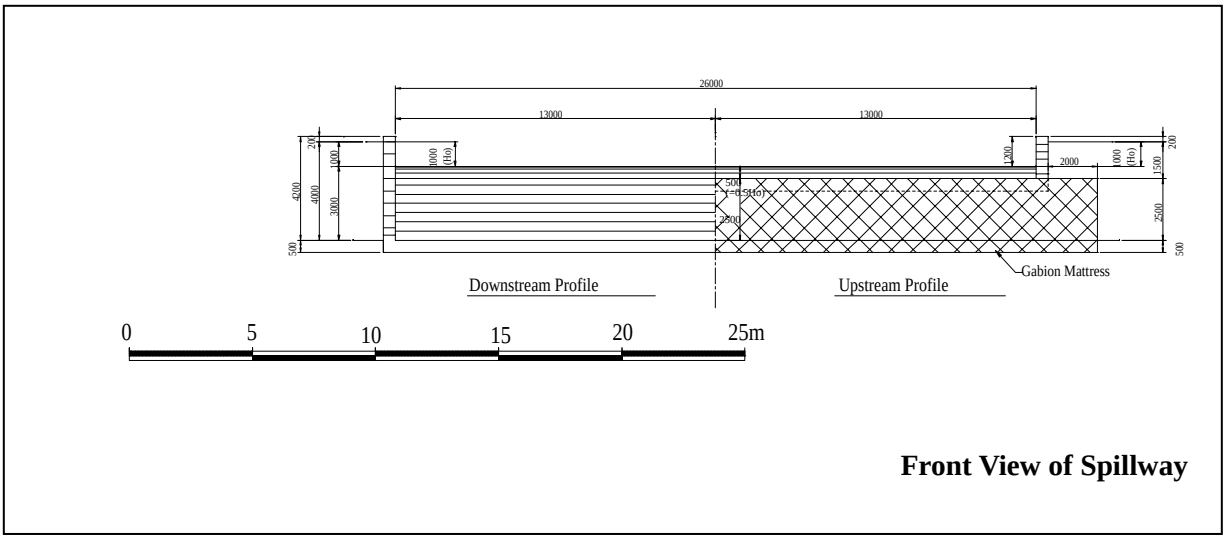
Fig, 2 (3/3) Spillway for Subdivision of 100ha



LONGITUDINAL PROFILE OF



Plan of Spillway



Front View of Spillway

Appendix 3-2

Draft Ordinance for "Growth Management Ordinance in the Province of Cavite"

Republic of the Philippines
PROVINCE OF CAVITE
SANGGUNIANG PANLALAWIGAN

PROVINCIAL ORDINANCE NO. _____
Series of 2008

SECTION 1.0 TITLE

The ordinance shall be known as "Growth Management Ordinance in the Province of Cavite."

SECTION 2.0 DECLARATION OF POLICIES

Development pressure in the Province of Cavite is high with an influx of population in-migration. The high-level of in-migration has caused high level of development activities in the recipient communities. The development activities have negatively affected and expected to affect living environment of the residents in the Province. The Provincial Government of Cavite, therefore, enforces this Ordinance in order to ensure controlled development and to secure life and property from flood.

SECTION 3.0 DEFINITION OF TERMS

“Built-up Expansion Area” is an area defined in the Provincial Physical Framework Plan and Comprehensive Land Use Plans.

“Urbanization Promotion Zone (UPZ)” is a zone already urbanized or is expected to be developed within ten (10) years.

“Urbanization Control Zone (UCZ)” is a zone where urbanization is controlled or natural environment is protected.

"Growth boundary" is a boundary set between Urbanization Promotion Zone and Urbanization Control Zone.

“Flood Management Area” is a flood prone area with a water depth of deeper than twenty five (25) centimeters in a probability of two-year flood return period.

SECTION 4.0 ACRONYMS

CLUP stands for Comprehensive Land Use Plan.

C/MPDO stands for City/Municipal Planning and Development Office

C/MPDC stands for City/Municipal Planning and Development Coordinator.

PLUC stands for Provincial Land Use Committee.

PPDC stands for Provincial Planning and Development Coordinator.

PPDO stands for Provincial Planning and Development Office.

PPFP stands for Provincial Development and Physical Framework Plan.

SP stands for Sangguniang Panlalawigan.

SECTION 5.0 SCOPE OF APPLICATION

The application of the ordinance shall be applicable within the administrative boundary of the Province of Cavite.

SECTION 6.0 GROWTH BOUNDARIES

All the land in the Province of Cavite shall have a "Built-up Expansion Area" land use category in land use planning. The Growth Boundaries divides the "Built-up Expansion Area" into two categories: UPZ and UCZ.

SECTION 7.0 DELINEATION OF GROWTH BOUNDARIES

The PPFP shall include the "Growth Boundary". The City/Municipality shall incorporate the policy of the growth boundary set in the PPFP and revise the CLUPs in a timely manner. The city/municipal zoning ordinances shall be revised accordingly.

SECTION 8.0 DEVELOPMENT IN URBANIZATION CONTROL ZONES

8.1 Conditions

In UCZs, a development project with a project area smaller than ten (10) hectares shall not be allowed. In UCZs, only the following development activities are permitted:

1. Public works projects conducted by the Governments and utility companies projects approved by the Government Agencies (Case-A) ;
2. Facility development for agricultural production (Case-B) ; and
3. Extension of farmhouses (Case-C).

Continuous uses of existing structures are permitted with the following conditions:

1. Uses of improvements are not changed; and
2. Improvements are not extended.

8.2 Delineation of Flood Management Area

The flood prone areas with a water depth of deeper than twenty five (25) centimeters in a probability of two-year flood return period shall be designated as the "Flood Management Area". The PPDO and Engineering Department shall designate the Flood Management Areas, and the PPFP shall be revised to include the Flood Management Areas in the land use plan of the PPFP. The City/Municipality shall incorporate the Flood Management Areas set in the PPFP and revise the CLUPs in a timely manner. The city/municipal zoning ordinances shall be revised accordingly.

8.3 Development in Flood Management Areas

1 The Lowest Floor Elevation

The lowest floor of any new or substantially improved residential building shall be elevated at least fifty (50) centimeters from the present ground level or equipped with flood-proofing devises or facilities to prevent water intrusion. The building not for residence is also required to equip similar devises or facilities for the safety from damage by water intrusion.

2. Review and Approval of Permit Application in Flood Management Areas

The building application for permit shall be submitted to the Office of the City/Municipal Building Officials as stipulated in the National Building Code. A licensed surveyor or engineer shall inspect the lowest floor elevation to be approved by the Building Official.

8.4 Accuracy of Base Maps for the PPFP

The accuracy of base map shall be equivalent to a topographic map at a scale of 1:20,000.

8.5 Preparation of Growth Boundaries

The PPFP shall designate a "Built-up Expansion Area" in the land plan. The Built-up Expansion Area shall be divided into UPZs and UCZs.

8.6 Development Application

The developer shall submit a copy of the application documents to the C/MPDCs. The C/MPDCs shall submit the copy to the Sangguniang Panlalawigan (SP) and consequently refers the same to the PPDO for review on the following items:

1. Conformity to the PPFP
2. Development impact to the neighboring cities and municipalities
3. Requirement of the On-site Flood Regulation Pond(s)
4. Availability of public services
5. Impacts to the regional circulation systems,
6. Availability of water supply;
7. Impacts to agriculture; and
8. Impacts to environmentally sensitive areas.

The PPDO shall submit its recommendations to the SP for approval. The SP shall issue a certification when the development project satisfies the above conditions.

The City/Municipal Government shall consider the certification issued by the SP as a condition for the final approval and issuance of development permit.

8.7 Preparation of Land Use Cross Identification Map

PPDC shall prepare a land use cross identification map. The map is an overlay of the land use component of the PPFP and City/Municipal Land Use Plans.

When the land use plans are examined by the PPDC, the maps submitted by the C/MPDOs shall be overlaid on the land use plan of the PPFP. The PPDC shall prepare an overlay map to identify possible land use conflict.

SECTION 9.0 FEES

The fee for reviewing a development project within a UCZ shall be PHP _____.

SECTION 10.0 ORDINANCE VIOLATION AND PENALTIES

For failing to submit a copy of development application to the SP or to revise the application in accordance with the recommendations of the PPDO before commencement of construction work, the maximum penalty upon conviction shall not exceed PHP5,000 or one year imprisonment.

SECTION 11.0 EFECTIVITY

This Ordinance shall take effect immediately.

Unanimously approved:

DENCITO P. CAMPAÑA
Vice Governor/Presiding Officer

RECTO M. CANTIMBUHAN
Sanggunian Member

RAYMUNDO A. DEL ROSARIO
Sanggunian Member

CESARIO R. DEL ROSARIO, JR.
Sanggunian Member

ALEX L. ADVINCULA
Sanggunian Member

RESTITUTO T. ENRIQUEZ
Sanggunian Member

ARLENE C. ARAYATA
Sanggunian Member

EILEEN R. BERATIO
Sanggunian Member

VIRGILIO T. AMBION
Sanggunian Member

LOPE D. TEPORA
Sanggunian Member

LUIS T. PAGTAKHAN
Sanggunian Member

REMIGIO G. DILAG
SB Prov'l Fed., President

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ABC Prov's Fed. President

JUAN MIGUEL C. ILANO
SK Prov'l President

ATTESTED:

JOSE R. DE CASTRO, SR.
Provincial Board Secretary

APPROVED:

AYONG S. MALIKSI
Provincial Governor