DRAWINGS

Drawing List

Draw. No.	Title
Concepcion Hydroelectric Power Plant	
Civil Works	
CC-CV-01	Water Pipe, General Plan (1/2)
CC-CV-02	Water Pipe, General Plan (2/2)
CC-CV-03	Water Pipe, Profile (1/2)
CC-CV-04	Water Pipe, Profile (2/2)
CC-CV-05	Water Pipe, Typical Sections
CC-CV-06	Valve Pits, Details
CC-CV-07	Concrete Blocks, Details
CC-CV-08	Powerhouse, General Layout Plan
CC-CV-09	Powerhouse, Sections (1/2)
CC-CV-10	Powerhouse, Sections (2/2)
CC-CV-11	Powerhouse, Typical Sections
CC-CV-12	Powerhouse, Concrete Outline Plan
CC-CV-13	Powerhouse, Concrete Outline Profile and Sections
CC-CV-14	Powerhouse, Reinforcement Arrangement
Electro-mechanical and Electrical Works	
CC-EM-01	Equipment Layout Plan
CC-EM-02	34.5kV Single Line Diagram
CC-EM-03	34.5kV Power Cable Route
CC-EM-05	Communication Cable Route
CC-EM-04	Control Room (Concepcion Water Treatment Plant)
CC-EM-05	Communication Cable Route

Draw. No.	Title
Picacho Hydroelectric Power Plant	
Civil Works	
PC-CV-01	Powerhouse Area, General Plan
PC-CV-02	Powerhouse, General Layout Plan
PC-CV-03	Powerhouse, Sections (1/3)
PC-CV-04	Powerhouse, Sections (2/3)
PC-CV-05	Powerhouse, Sections (3/3)
PC-CV-06	Powerhouse, Concrete Outline Plan and Sections (1/2)
PC-CV-07	Powerhouse, Concrete Outline Profile and Sections (2/2)
PC-CV-08	Powerhouse, Reinforcement Arrangement
Electro-mechanical and Electrical Works	
PC-EM-01	Equipment Layout Plan
PC-EM-02	13.8kV Single Line Diagram
PC-EM-03	13.8kV Power Cable and Distribution Line Route
PC-EM-04	Control Room (Picacho Water Treatment Plant)
PC-EM-05	Communication Cable Route

CONCEPCIÓN HYDROELECTRIC POWER PLANT

No.	IA
IP. 1	88d05'10"
IP. 2	90d00'00"
VB. 1	12d00'00"
VB. 2	5d30'00"
VB. 3	2d30'00"
VB. 4	3d00'00"
VB. 5	1d00'00"
IP. 3	62d24'26"
IP. 4	90d00'00"
VB. 6	2d30'00"
IP. 5	9d18'34"
IP. 6	10d00'00"
VB. 7	0d30'00"
IP. 7	45d00'00"
IP. 8	45d00'00"
IP. 9	95d30'00"
VB. 8	1d00'00"
IP. 10	4d00'00"
IP. 11	3d00'00"
VB. 9	2d00'00"
IP. 12	4d30'00"
VB. 10	2d00'00"
IP. 13	12d00'00"
VB. 11	0d30'00"
IP. 14	2d00'00"
IP. 15	23d00'00"
VB. 12	1d30'00"
IP. 16	13d00'00"
VB. 13	4d00'00"
IP. 17	15d00'00"
VB. 14	1d00'00"
IP. 18	5d00'00"
VB. 15	1d00'00"
VB. 16	1d00'00"
IP. 19	17d00'00"

No.	IA
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IP. 21	20d00'00"
IP. 22	17d00'00"
VB. 17	1d30'00"
IP. 23	7d00'00"
VB. 18	1d30'00"
IP. 24	30d00'00"
IP. 25	30d00'00"
IP. 26	45d00'00"
IP. 27	11d00'00"
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VB. 20	2d00'00"
VB. 21	1d30'00"
IP. 28	13d00'00"
IP. 29	13d00'00"
VB. 22	1d30'00"
IP. 30	12d00'00"
VB. 23	1d30'00"
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IP. 32	14d00'00"
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IP. 35	15d00'00"
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VB. 25	2d00'00"
IP. 37	5d00'00"
IP. 38	10d00'00"
IP. 39	7d00'00"
VB. 26	2d00'00"
IP. 40	12d00'00"
VB. 27	3d00'00"
IP. 41	65d00'00"
VB. 28	8d00'00"
IP. 42	32d30'00"

No.	IA
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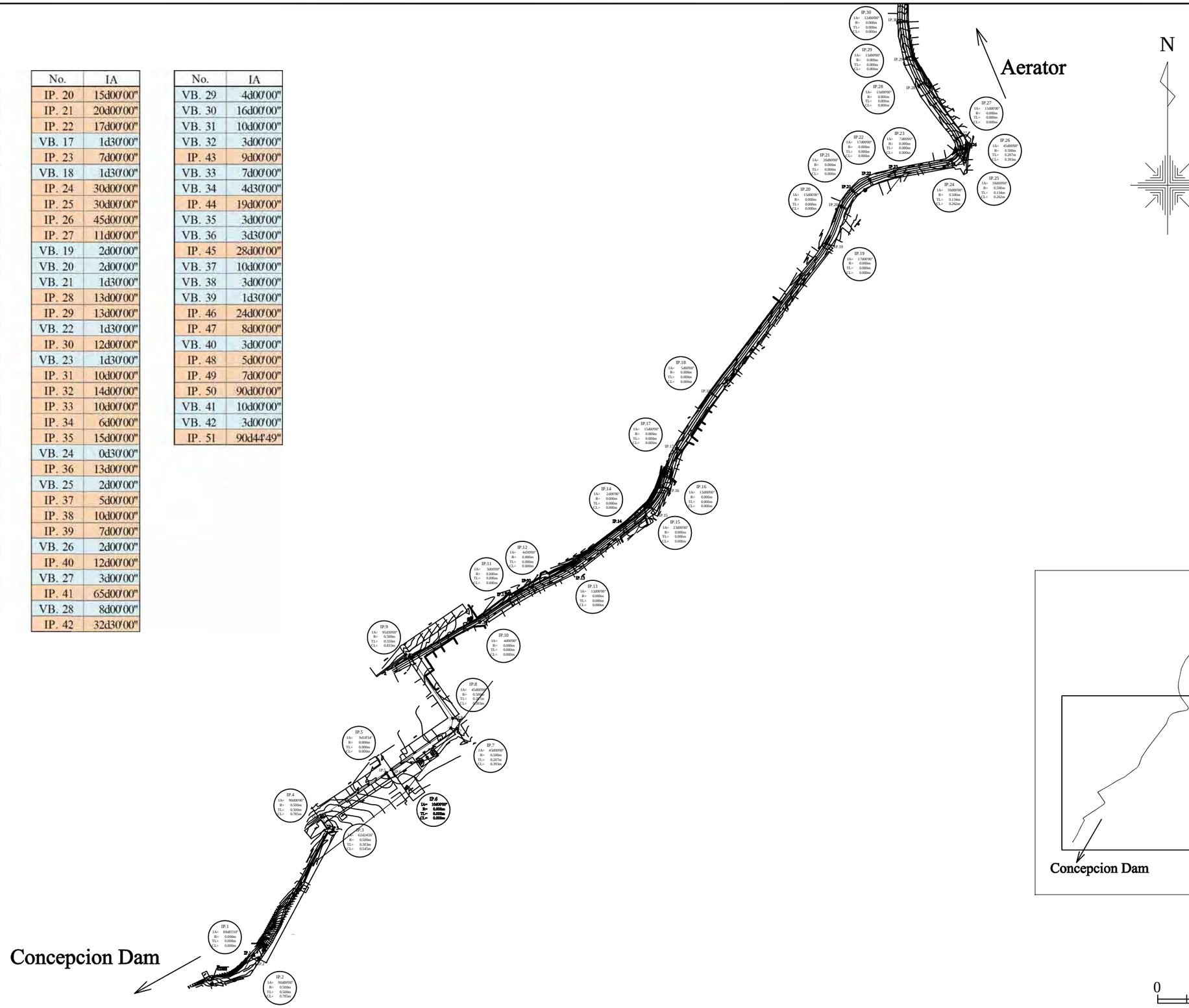
VB. 30	16d00'00"
VB. 31	10d00'00"
VB. 32	3d00'00"
IP. 43	9d00'00"
VB. 33	7d00'00"
VB. 34	4d30'00"
IP. 44	19d00'00"
VB. 35	3d00'00"
VB. 36	3d30'00"
IP. 45	28d00'00"
VB. 37	10d00'00"
VB. 38	3d00'00"
VB. 39	1d30'00"
IP. 46	24d00'00"
IP. 47	8d00'00"
VB. 40	3d00'00"
IP. 48	5d00'00"
IP. 49	7d00'00"
IP. 50	90d00'00"
VB. 41	10d00'00"
VB. 42	3d00'00"
IP. 51	90d44'49"



0 200(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Water pipe,General plan (1/2)**	CC-CV-01
				Dec.2012

No.	IA
IP. 1	88d05'10"
IP. 2	90d00'00"
VB. 1	12d00'00"
VB. 2	5d30'00"
VB. 3	2d30'00"
VB. 4	3d00'00"
VB. 5	1d00'00"
IP. 3	62d24'26"
IP. 4	90d00'00"
VB. 6	2d30'00"
IP. 5	9d18'34"
IP. 6	10d00'00"
VB. 7	0d30'00"
IP. 7	45d00'00"
IP. 8	45d00'00"
IP. 9	95d30'00"
VB. 8	1d00'00"
IP. 10	4d00'00"
IP. 11	3d00'00"
VB. 9	2d00'00"
IP. 12	4d30'00"
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IP. 13	12d00'00"
VB. 11	0d30'00"
IP. 14	2d00'00"
IP. 15	23d00'00"
VB. 12	1d30'00"
IP. 16	13d00'00"
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IP. 17	15d00'00"
VB. 14	1d00'00"
IP. 18	5d00'00"
VB. 15	1d00'00"
VB. 16	1d00'00"
IP. 19	17d00'00"

No.	IA
IP. 20	15d00'00"
IP. 21	20d00'00"
IP. 22	17d00'00"
VB. 17	1d30'00"
IP. 23	7d00'00"
VB. 18	1d30'00"
IP. 24	30d00'00"
IP. 25	30d00'00"
IP. 26	45d00'00"
IP. 27	11d00'00"
VB. 19	2d00'00"
VB. 20	2d00'00"
VB. 21	1d30'00"
IP. 28	13d00'00"
IP. 29	13d00'00"
VB. 22	1d30'00"
IP. 30	12d00'00"
VB. 23	1d30'00"
IP. 31	10d00'00"
IP. 32	14d00'00"
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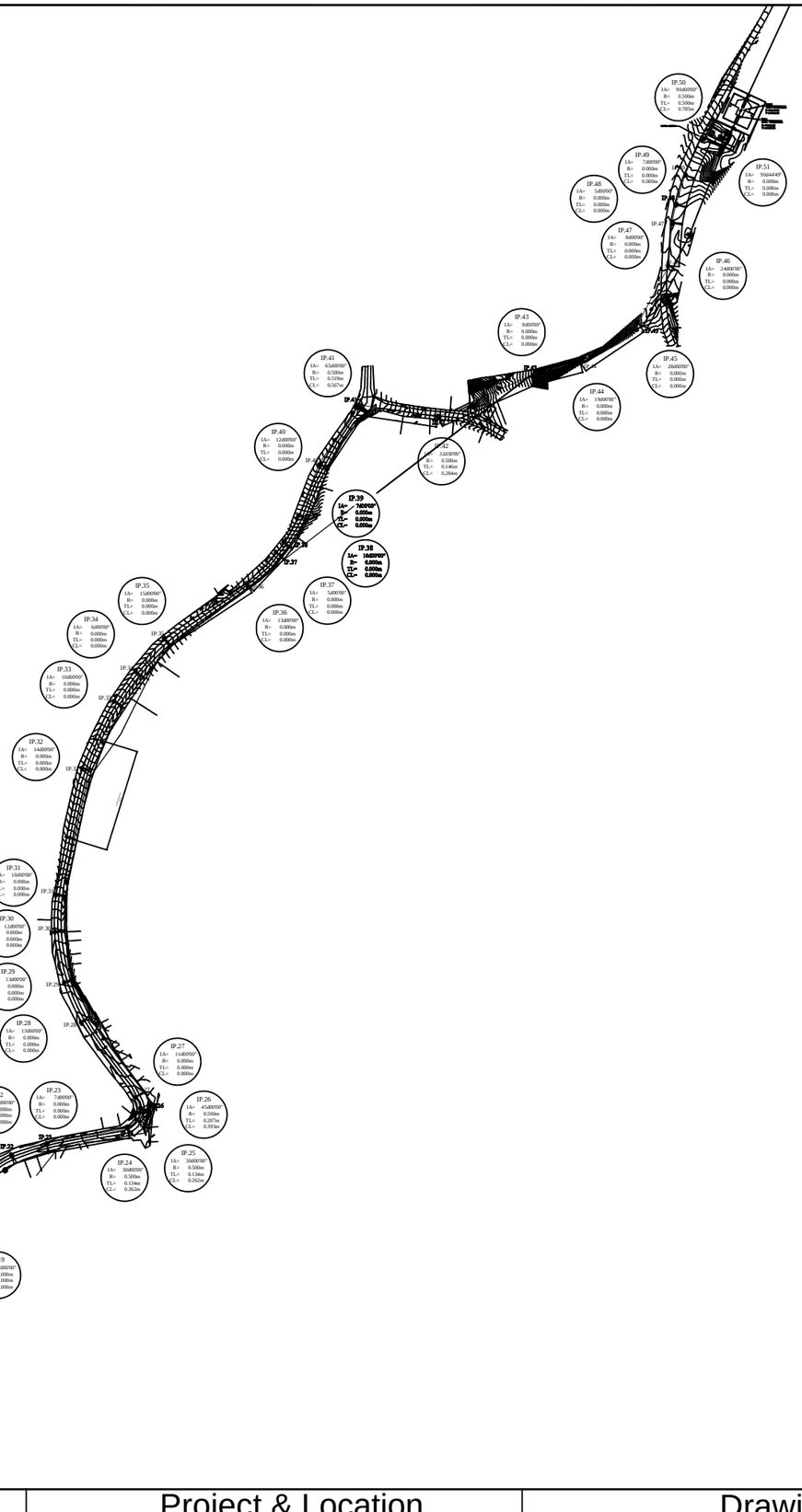
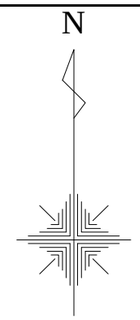
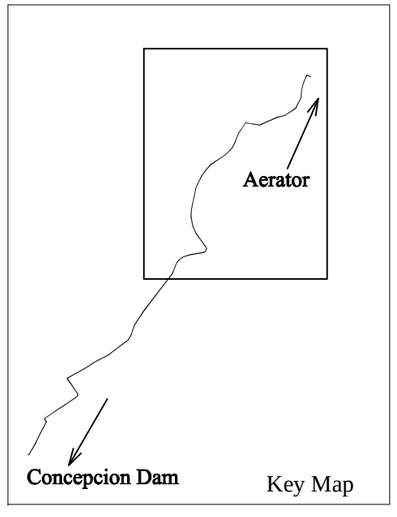
IP. 34	6d00'00"
IP. 35	15d00'00"
VB. 24	0d30'00"
IP. 36	13d00'00"
VB. 25	2d00'00"
IP. 37	5d00'00"
IP. 38	10d00'00"
IP. 39	7d00'00"
VB. 26	2d00'00"
IP. 40	12d00'00"
VB. 27	3d00'00"
IP. 41	65d00'00"
VB. 28	8d00'00"
IP. 42	32d30'00"

No.	IA
VB. 29	4d00'00"
VB. 30	16d00'00"
VB. 31	10d00'00"
VB. 32	3d00'00"
IP. 43	9d00'00"
VB. 33	7d00'00"
VB. 34	4d30'00"
IP. 44	19d00'00"
VB. 35	3d00'00"
VB. 36	3d30'00"
IP. 45	28d00'00"
VB. 37	10d00'00"
VB. 38	3d00'00"
VB. 39	1d30'00"
IP. 46	24d00'00"
IP. 47	8d00'00"
VB. 40	3d00'00"
IP. 48	5d00'00"
IP. 49	7d00'00"
IP. 50	90d00'00"
VB. 41	10d00'00"
IP. 51	90d44'49"
VB. 42	3d00'00"





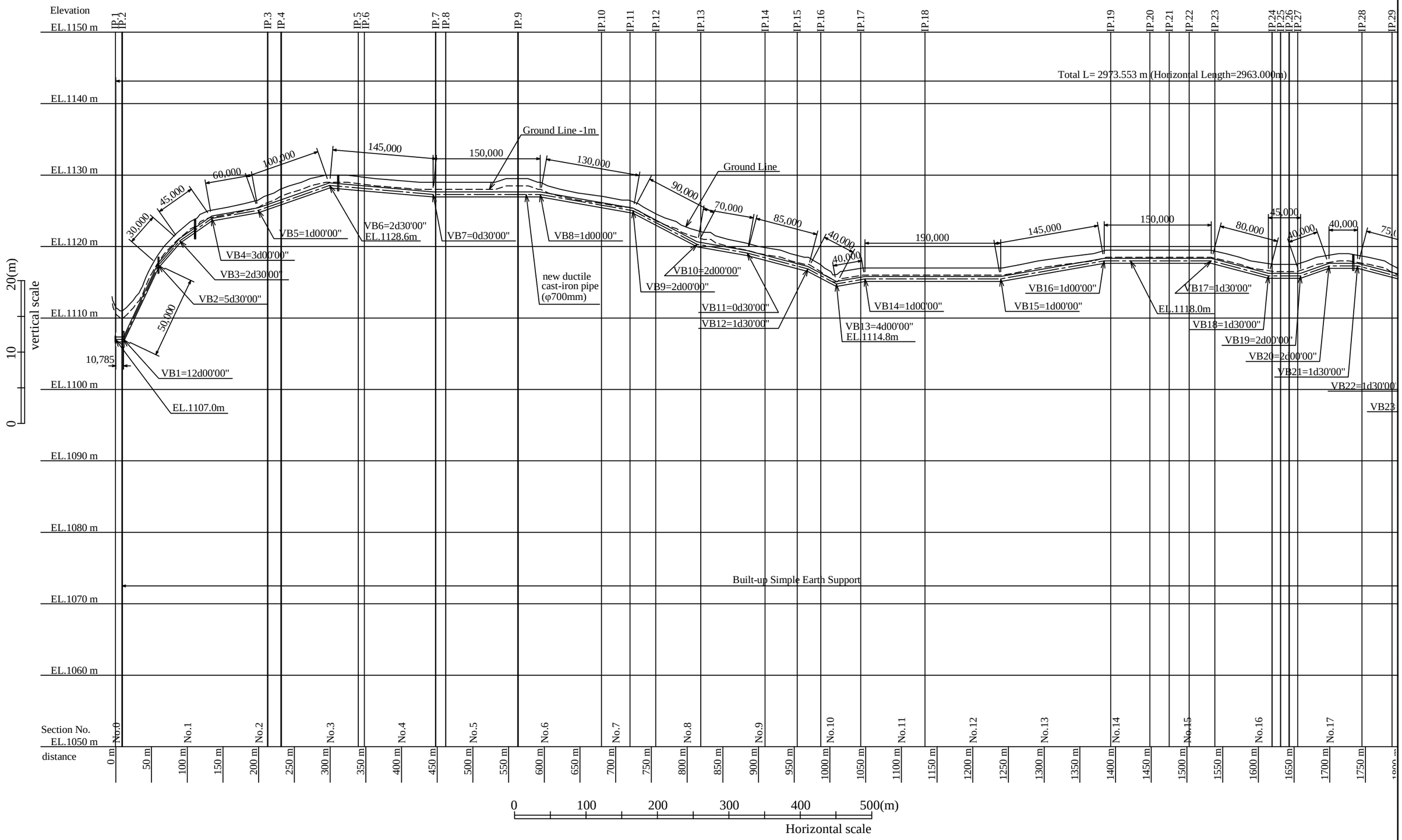


0 200(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Water pipe,General plan(2/2)**	CC-CV-02
				Dec.2012

← to Concepcion Dam

to Aerator →



	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Water pipe,Profile (1/2)**	CC-CV-03
				Dec.2012

← to Concepcion Dam

to Aerator →

Total L= 2973.553 m (Horizontal Length=2963.000m)

IP.19 IP.20 IP.21 IP.22 IP.23 IP.24 IP.25 IP.26 IP.27 IP.28 IP.29 IP.30 IP.31 IP.32 IP.33 IP.34 IP.35 IP.36 IP.37 IP.38 IP.39 IP.40 IP.41 IP.42 IP.43 IP.44 IP.45 IP.46 IP.47 IP.48 IP.49 IP.50 IP.51

Elevation

EL.1150 m
EL.1140 m
EL.1130 m
EL.1120 m
EL.1110 m
EL.1100 m
EL.1090 m
EL.1080 m
EL.1070 m
EL.1060 m
EL.1050 m

145,000 150,000 80,000 45,000 40,000 40,000 75,000 55,000 300,000 180,000 90,000 65,000 85,000 35,000 40,000 30,000 25,000 12,000 30,000 20,000 30,000 25,000 20,000 25,000 85,000 5,639 13,329 27,000 40,000

VB15=1d00'00"
VB16=1d00'00"
VB17=1d30'00"
EL.1118.0m
VB18=1d30'00"
VB19=2d00'00"
VB20=2d00'00"
VB21=1d30'00"
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VB26=2d00'00"
VB27=3d00'00"
VB28=8d00'00"
EL.1062.4m
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VB31=10d00'00"
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VB35=3d00'00"
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VB37=10d00'00"
VB38=3d00'00"
VB39=1d30'00"
VB39=1d30'00"
EL.1119.4m
VB40=3d00'00"
VB41=10d00'00"
VB42=3d00'00"
EL.1112.0m

Ground Line
Ground Line -1m
new ductile cast-iron pipe (φ700mm)

Built-up Simple Earth Support
Built-up Simple Earth Support

No.13 No.14 No.15 No.16 No.17 No.18 No.19 No.20 No.21 No.22 No.23 No.24 No.25 No.26 No.27 No.28 No.29

Section No.

1250 m 1300 m 1350 m 1400 m 1450 m 1500 m 1550 m 1600 m 1650 m 1700 m 1750 m 1800 m 1850 m 1900 m 1950 m 2000 m 2050 m 2100 m 2150 m 2200 m 2250 m 2300 m 2350 m 2400 m 2450 m 2500 m 2550 m 2600 m 2650 m 2700 m 2750 m 2800 m 2850 m 2900 m 2950 m 3000 m

distance

0 10 20(m) Vertical scale

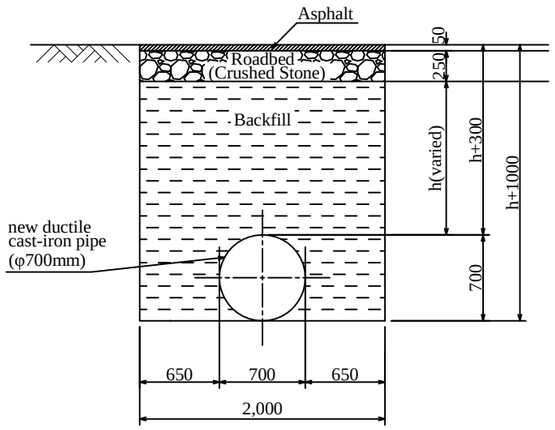
0 100 200 300 400 500(m)

Horizontal scale

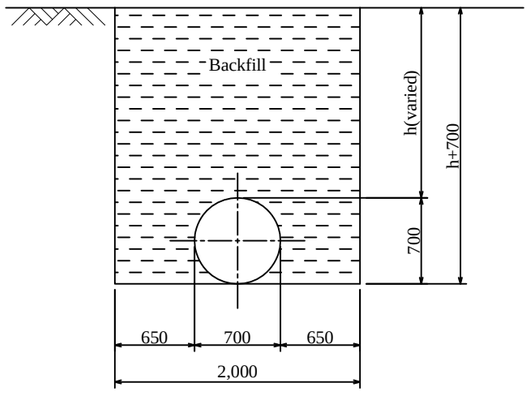
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location: The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	Drawing Title: **Concepcion Hydroelectric Power Plant Water pipe,Profile (2/2)**
			DWG No.: CC-CV-04
			Dec.2012

Typical Cross Section

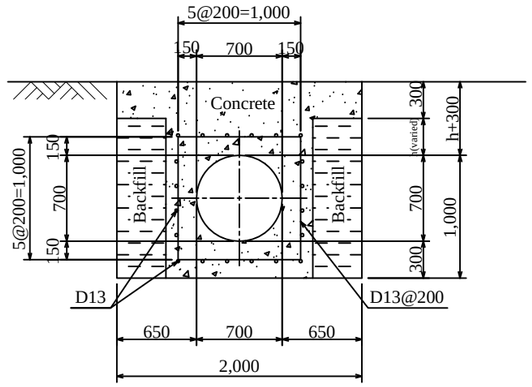
Road Secion
Soil Portion



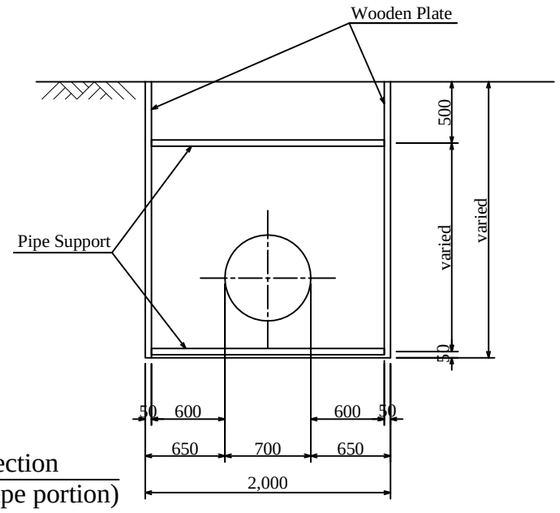
Non-road Secion
Soil Portion



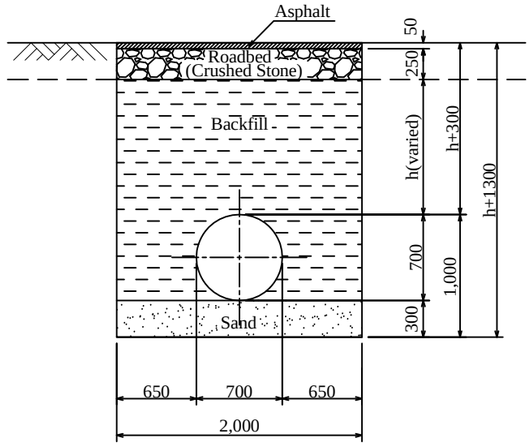
Road Secion
(H≦1200mm)



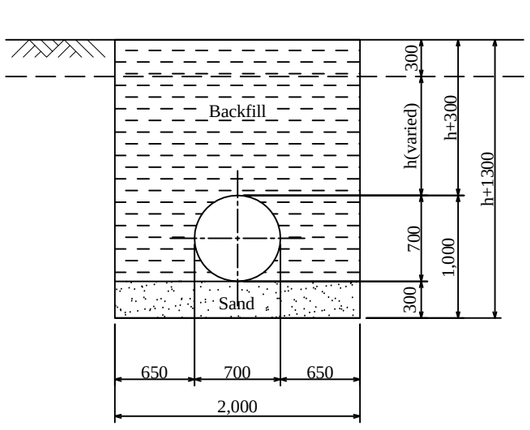
Built-up Simple Earth Support Section
(H≧1500mm)



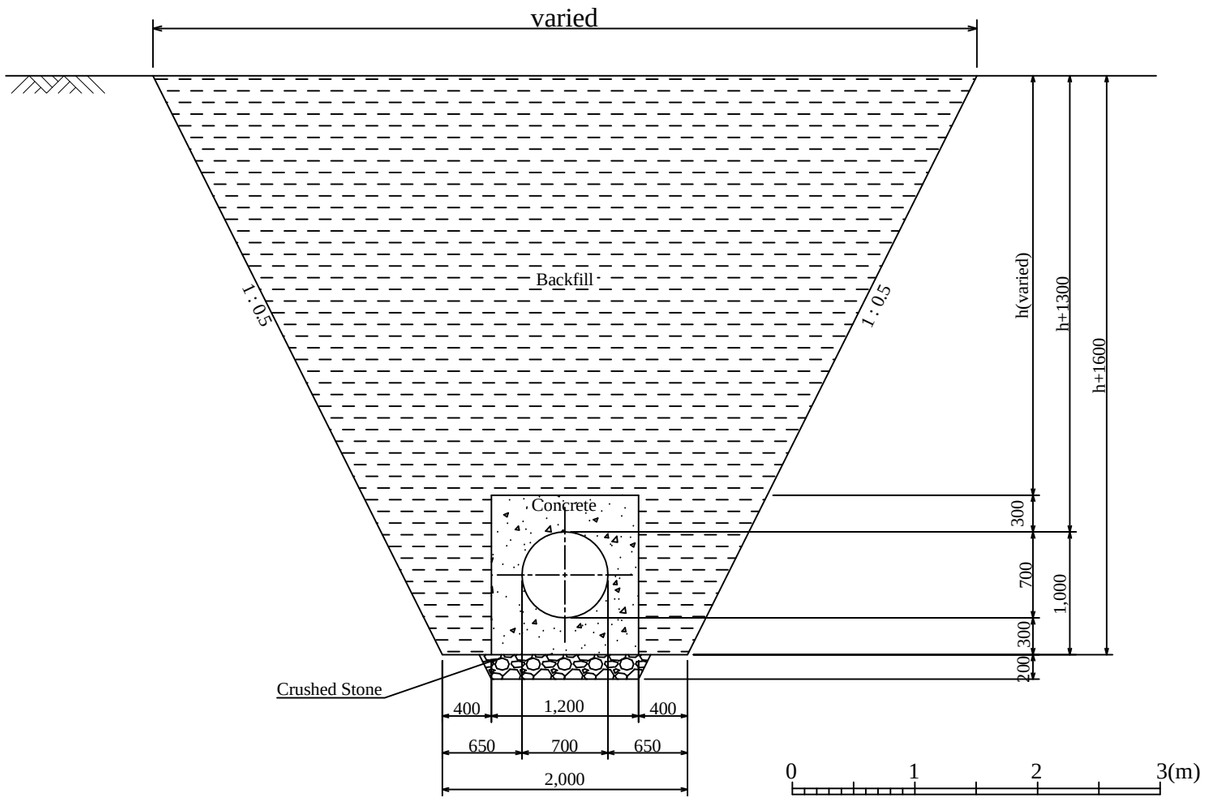
Road Secion
Rock Portion



Non-road Secion
Rock Portion

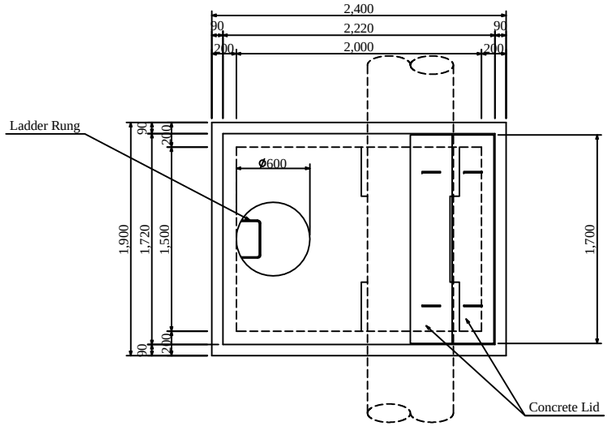


Open Excavation Section
Soil Portion(Bending pipe portion)

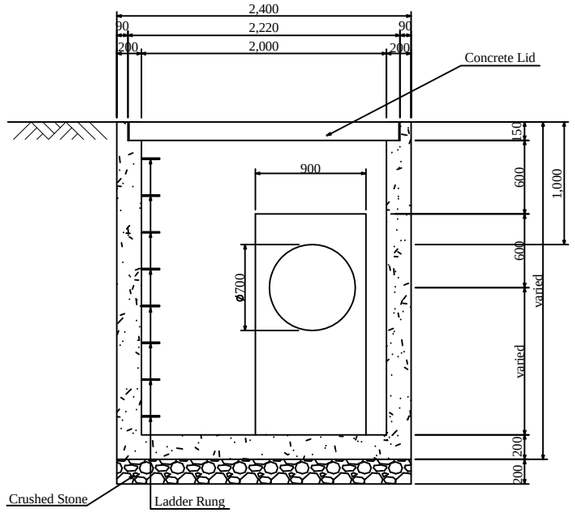


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location: The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	Drawing Title: **Concepcion Hydroelectric Power Plant Water pipe,Typical Sections**	DWG No.: CC-CV-05 Dec.2012

Plan

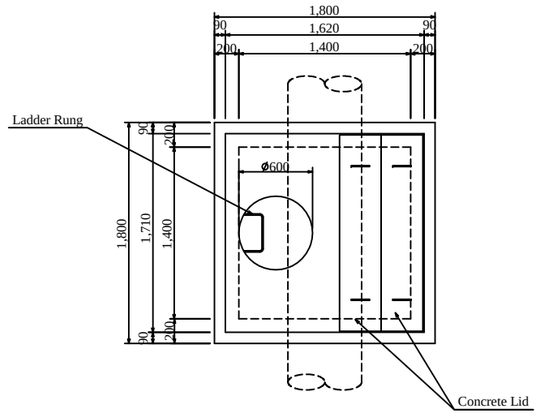


Section

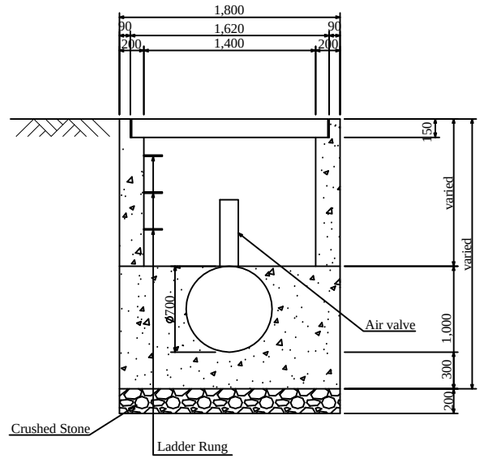


Gate Valve Pit

Plan

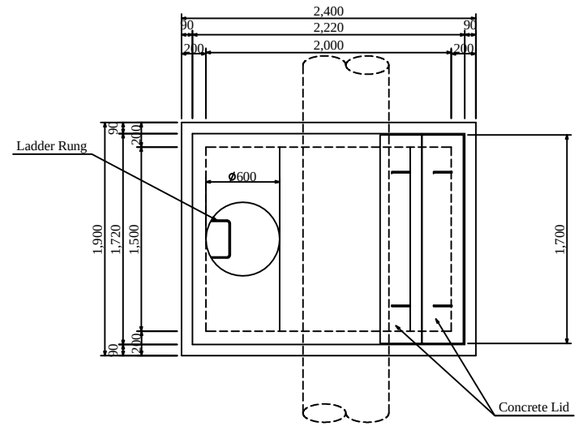


Section

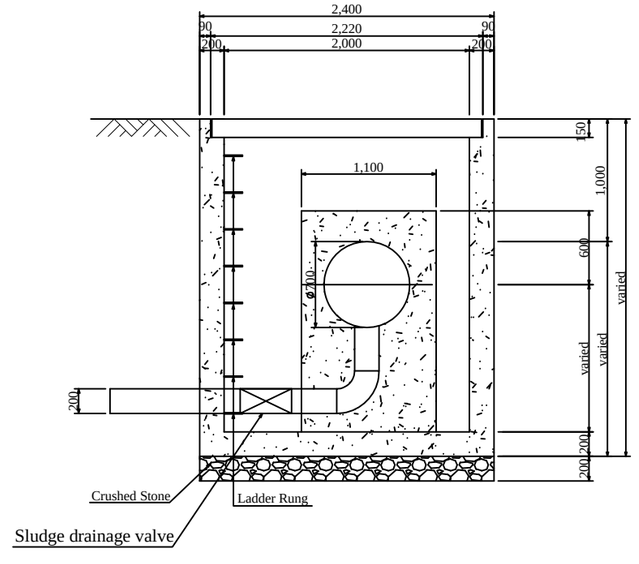


Air Valve pit

Plan



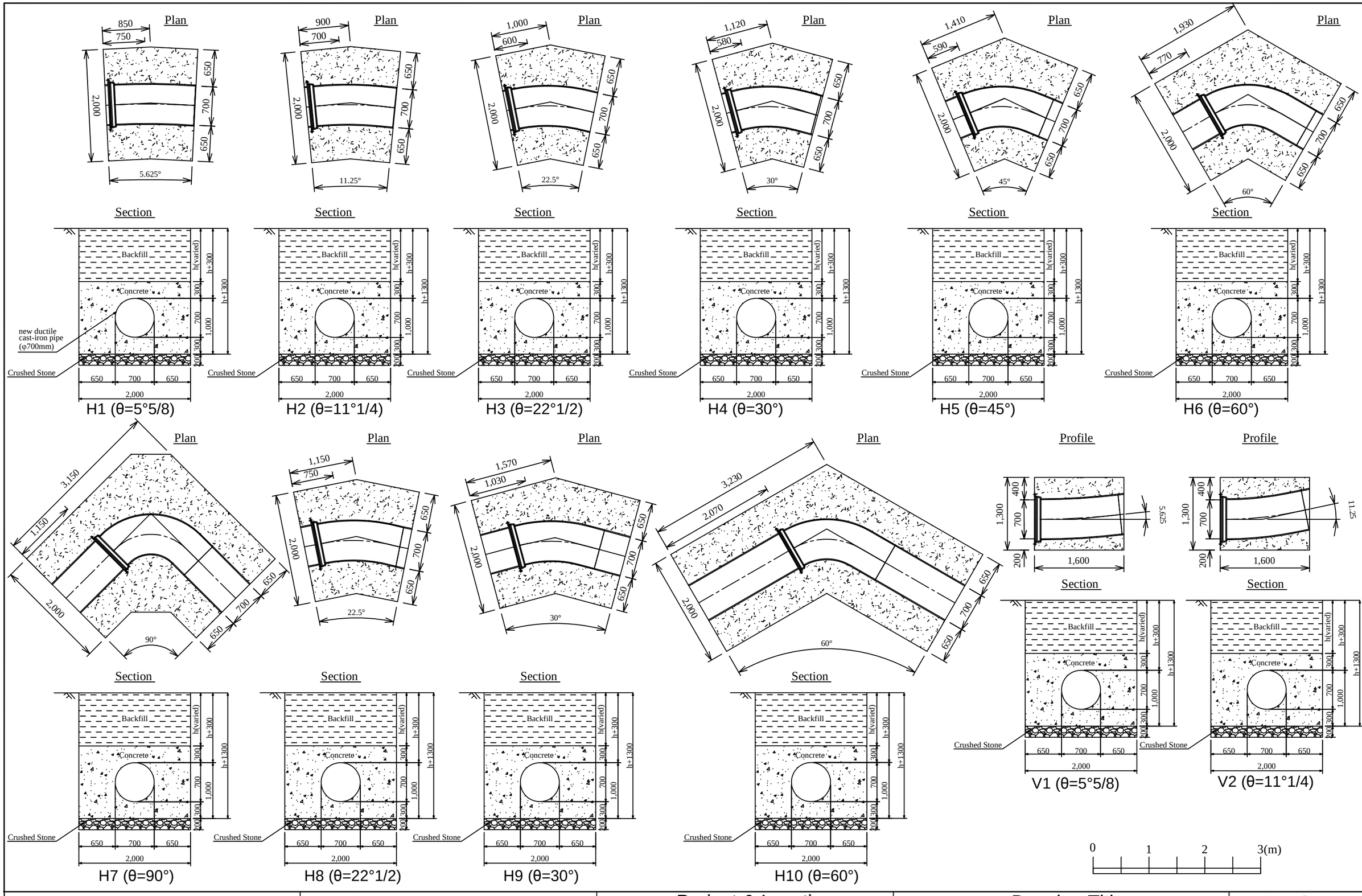
Section



Sludge Drainage Valve

0 3(m)

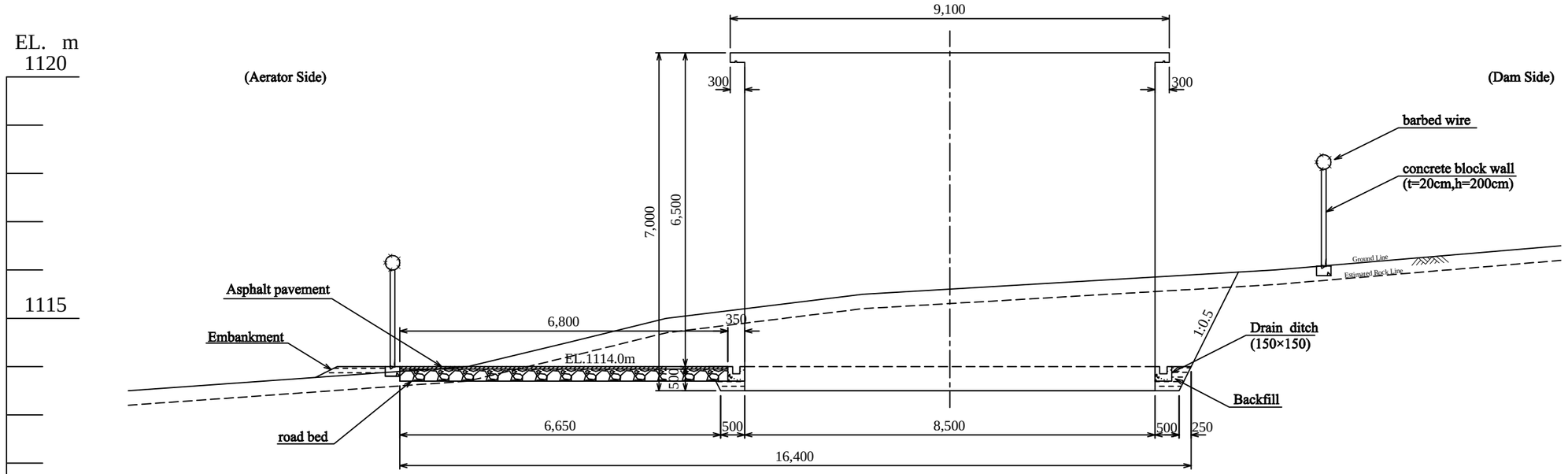
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Valve Pits,Details**	CC-CV-06
				Dec.2012



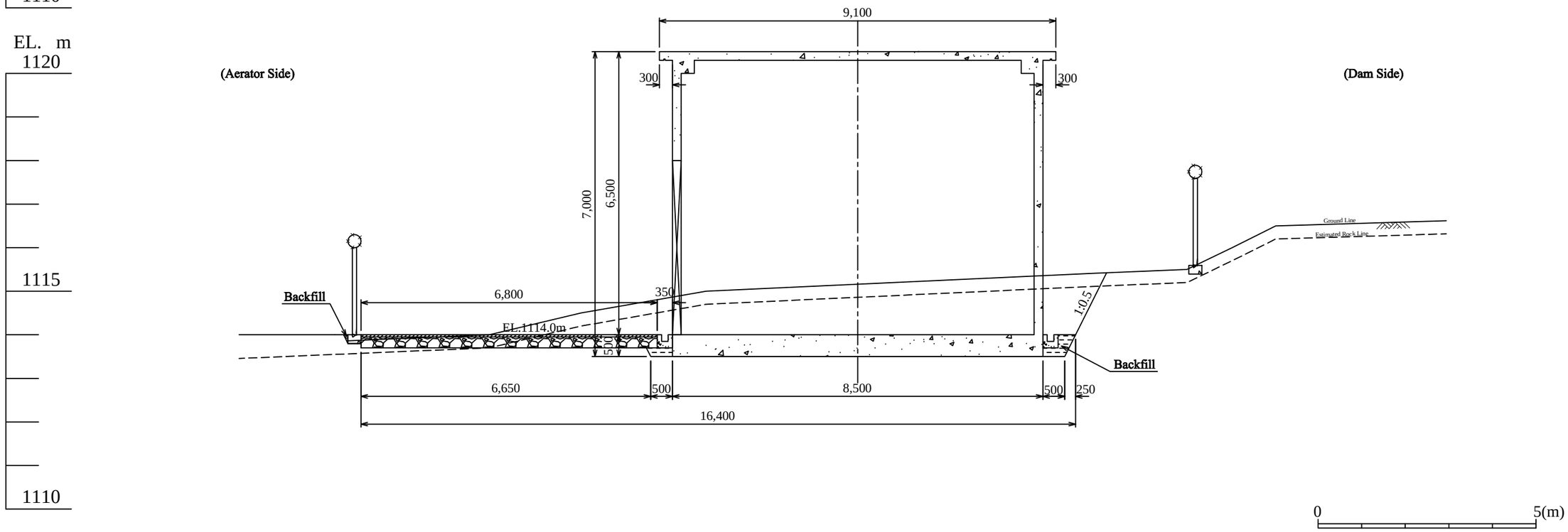
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Concrete Blocks Details**	CC-CV-07
				Dec.2012

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Powerhouse,General Layout plan**	CC-CV-08
				Dec.2012

Section 2-2



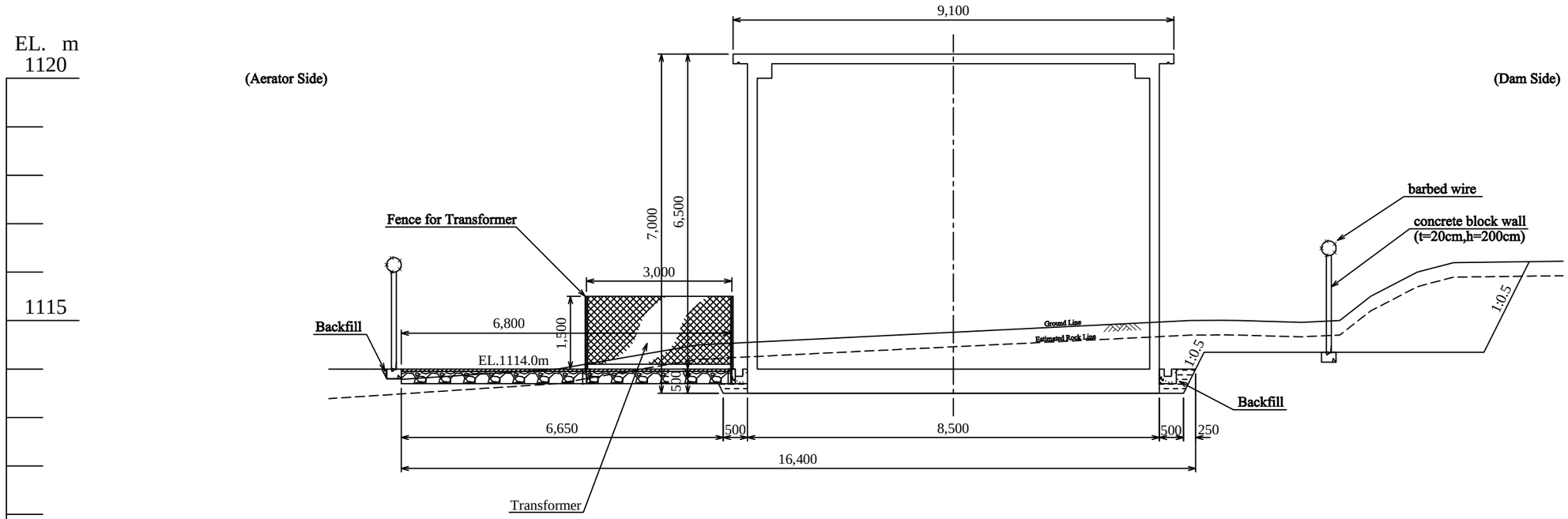
Section 4-4



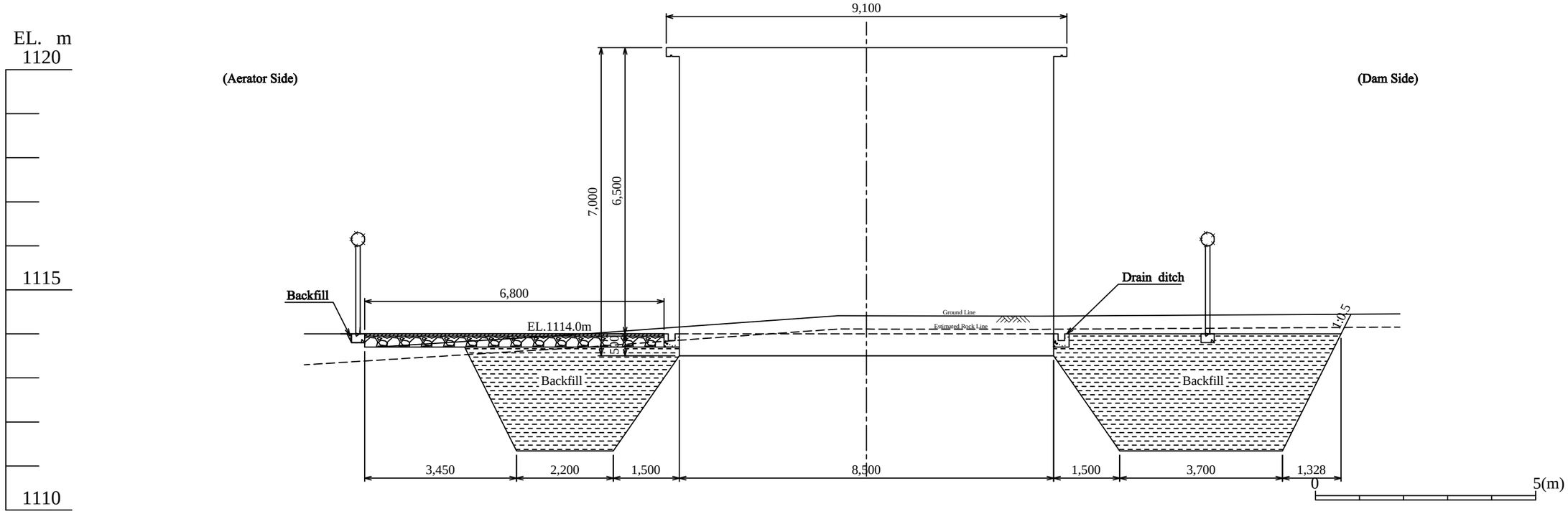
0 5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Powerhouse, Sections(1/2)**	CC-CV-09
				Dec.2012

Section 6-6

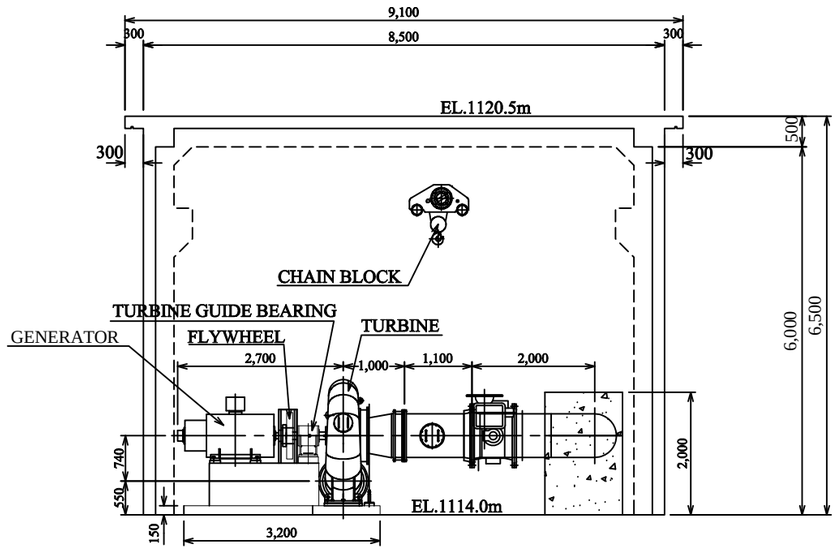


Section 8-8

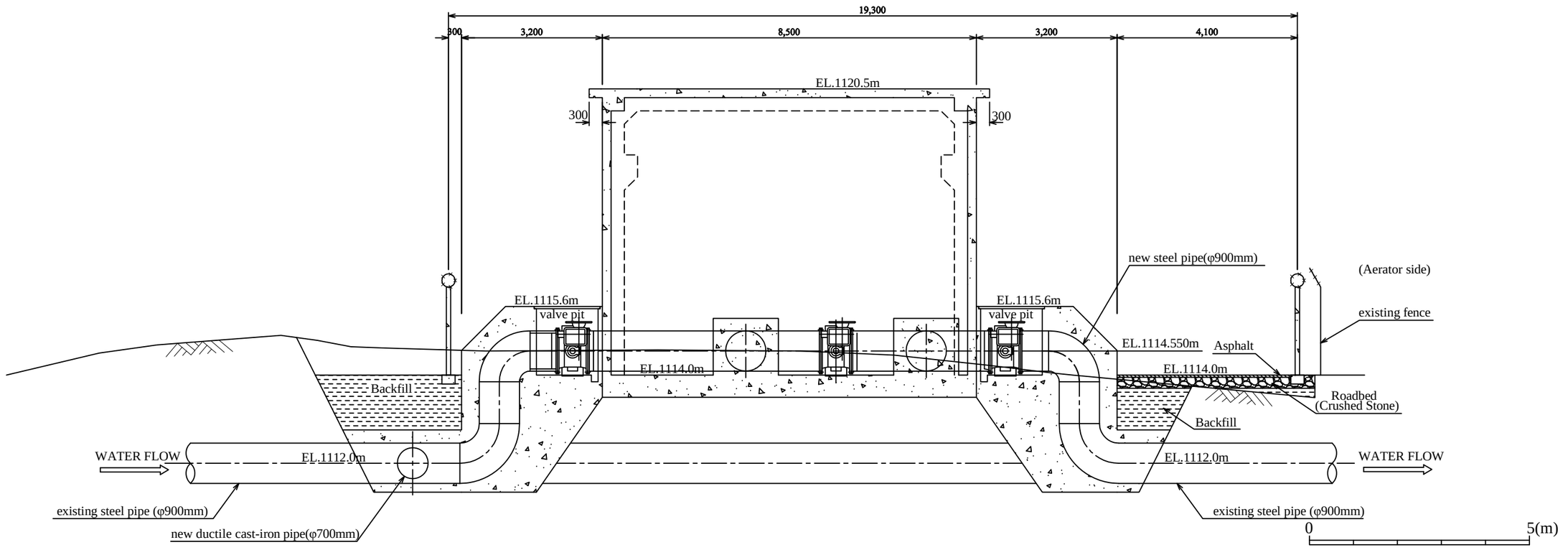


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Powerhouse, Sections(2/2)**	CC-CV-10
				Dec.2012

Section a-a

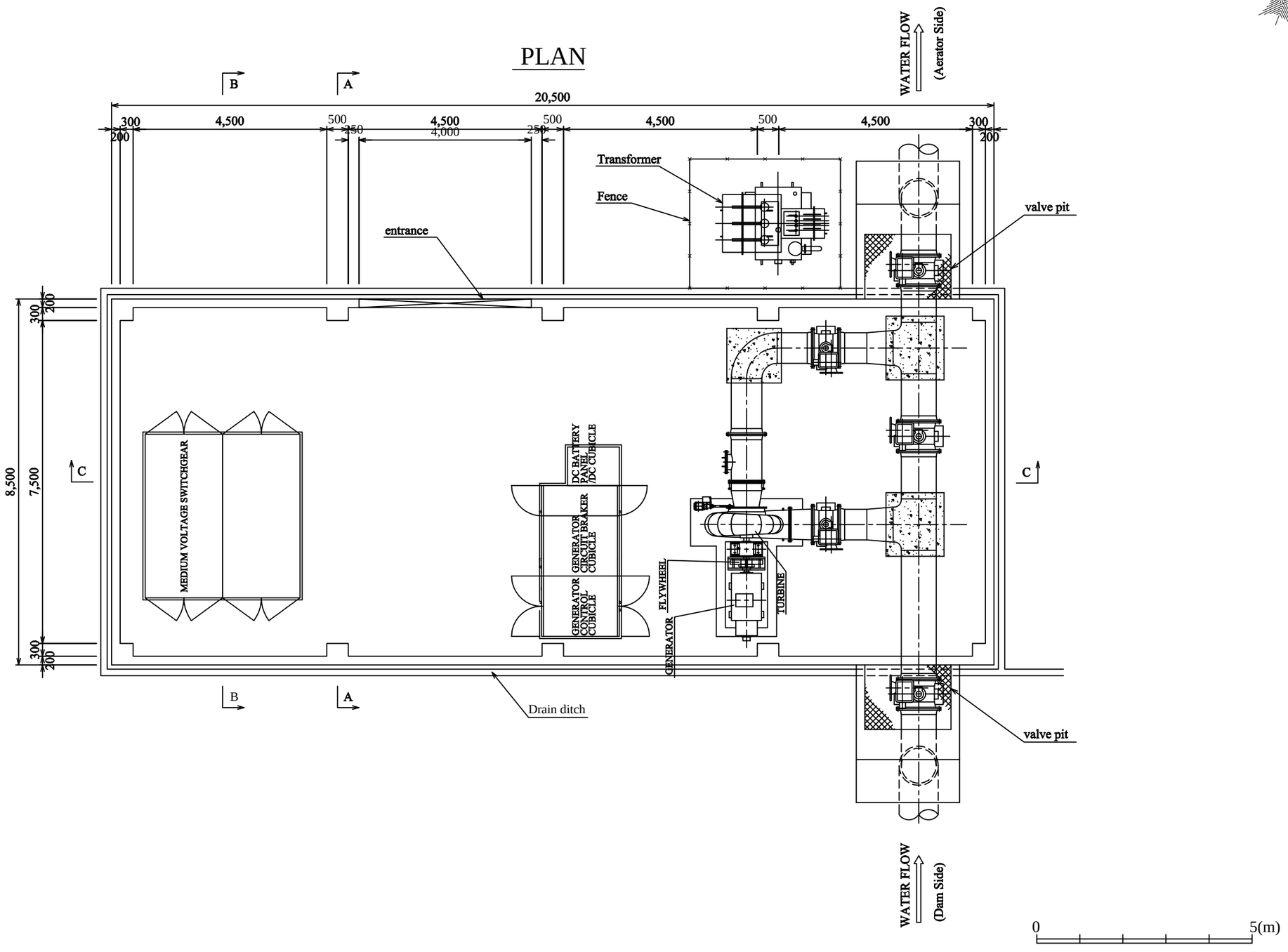


Section b-b



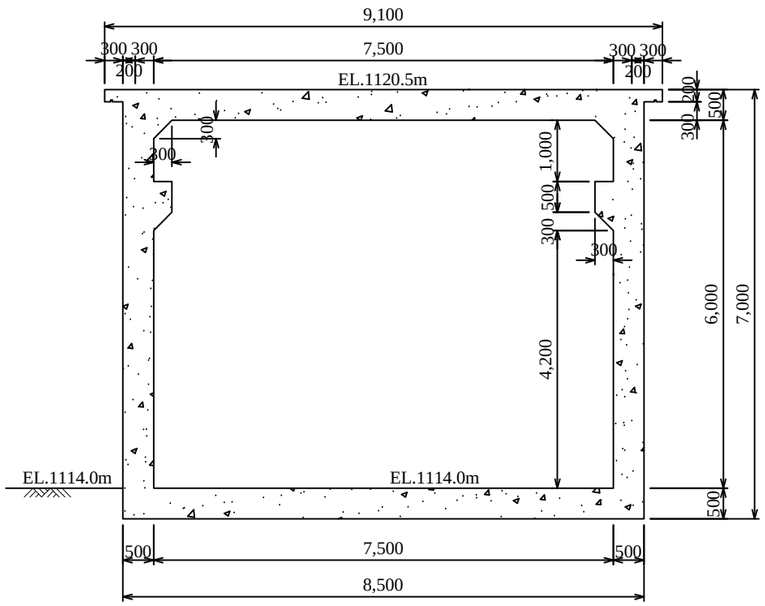
EL. m
1123
1120
1115
1110

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location: The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	Drawing Title: **Concepcion Hydroelectric Power Plant Powerhouse, Typical Sections**	DWG No.: CC-CV-11 Dec.2012

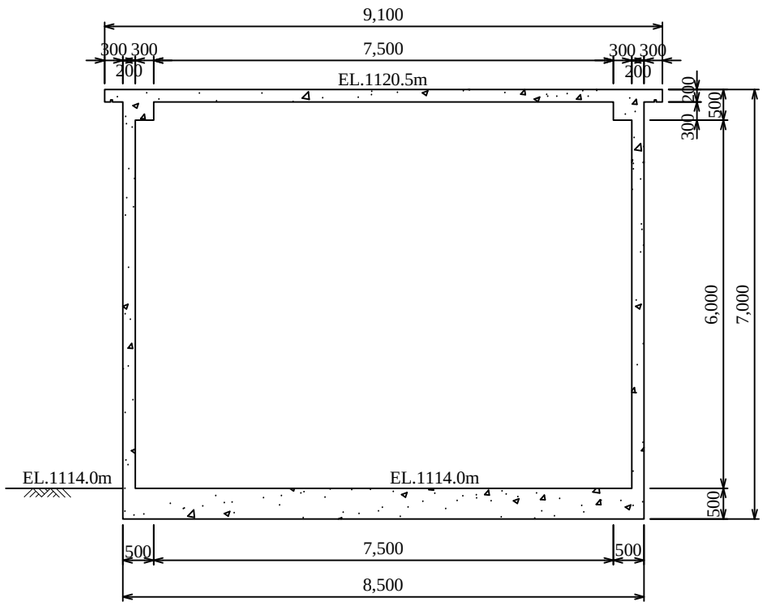


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Powerhouse, Concrete Outline Plan**	CC-CV-12
				Dec.2012

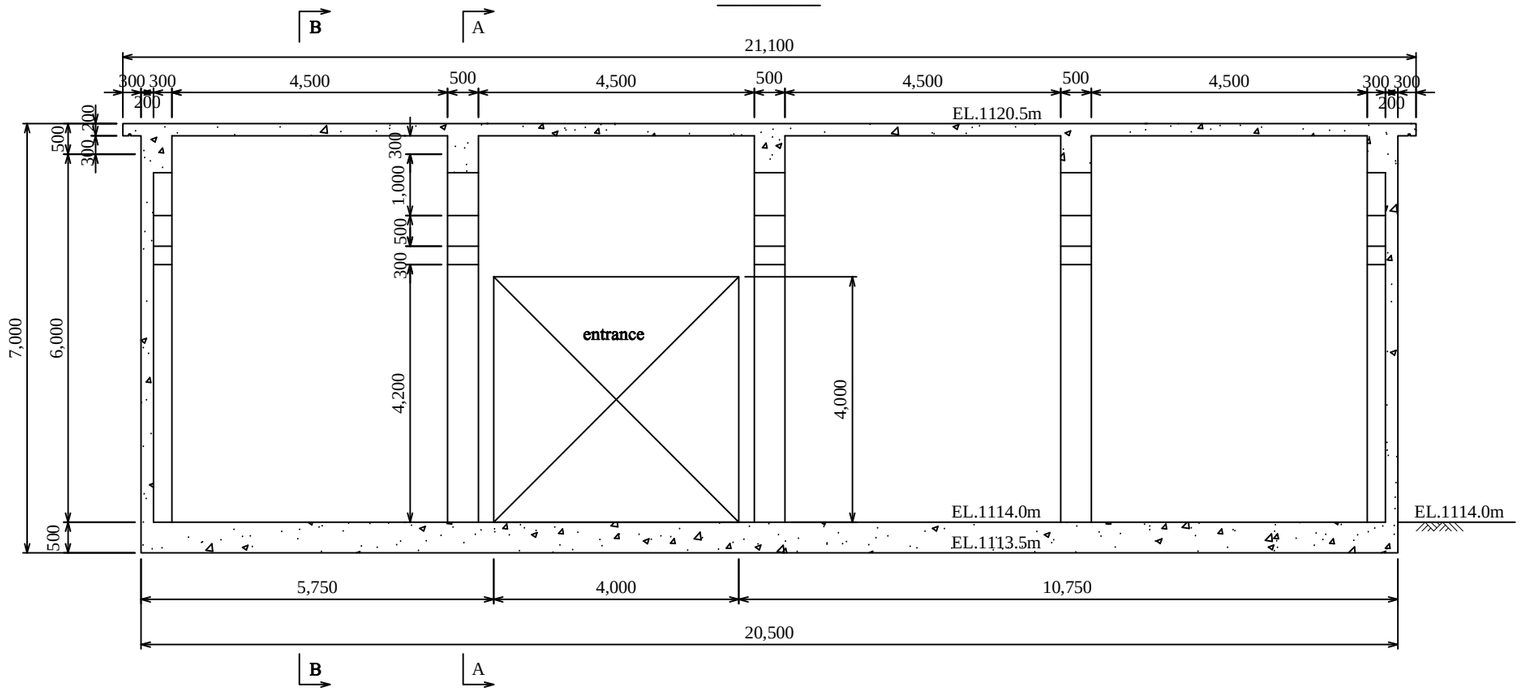
A - A



B - B



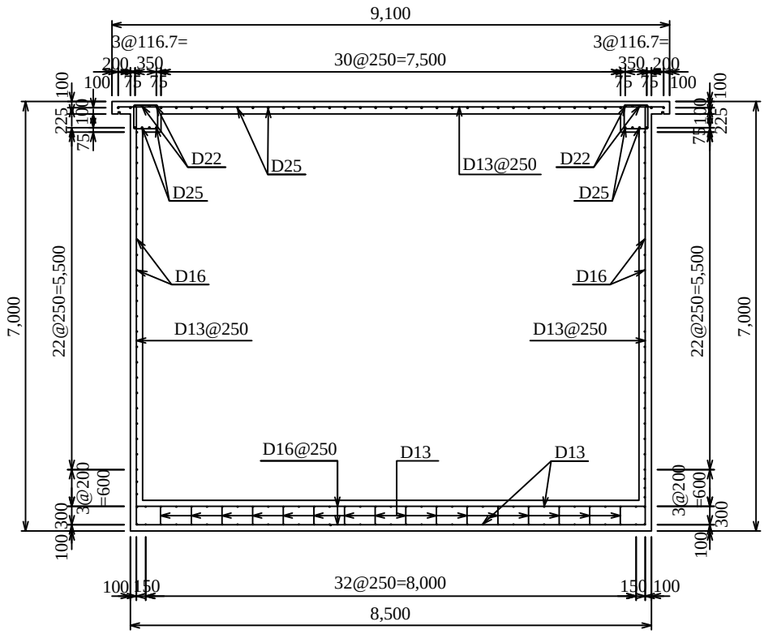
C - C



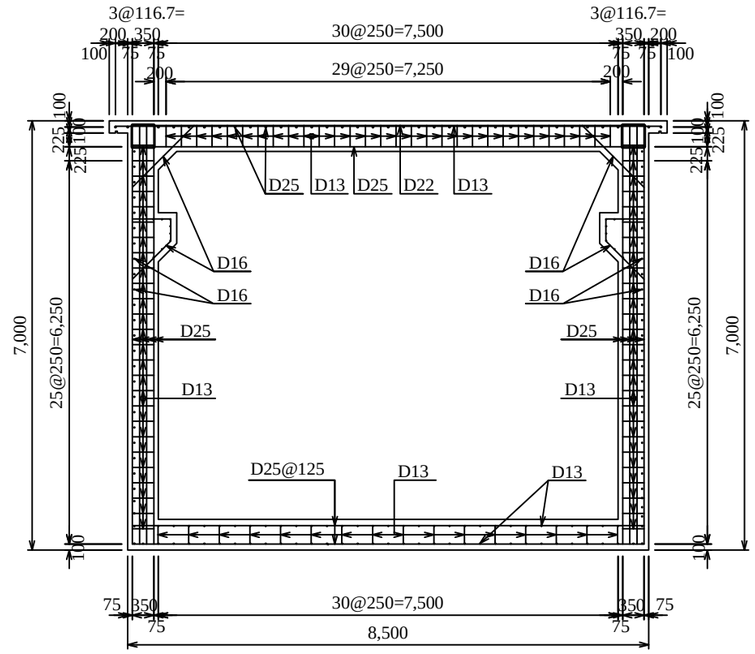
0 5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Powerhouse, Concrete Outline Profile and Sections**	CC-CV-13
				Dec.2012

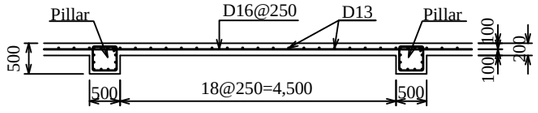
Non-pilar section
Scale1



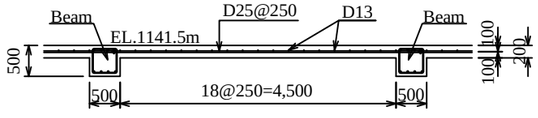
Pillar Section
Scale1



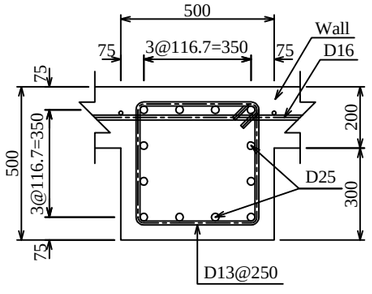
Wall Section
Scale1



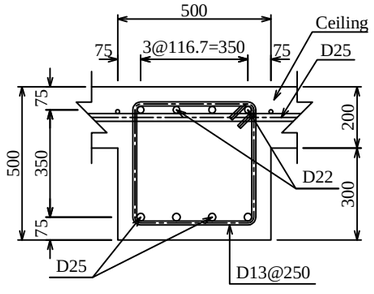
Ceiling Section
Scale1



Pillar Section
Scale2



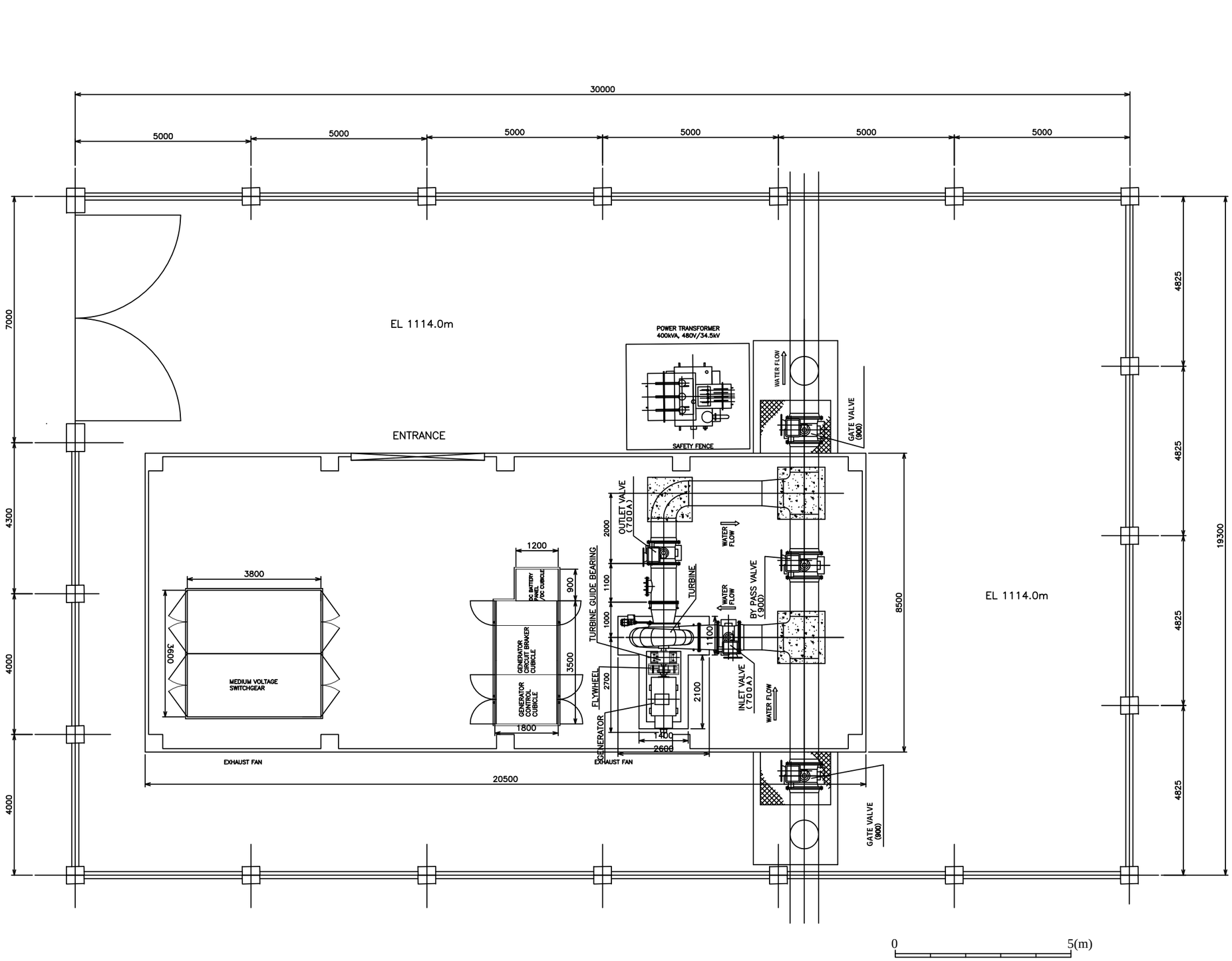
Beam Section
Scale2



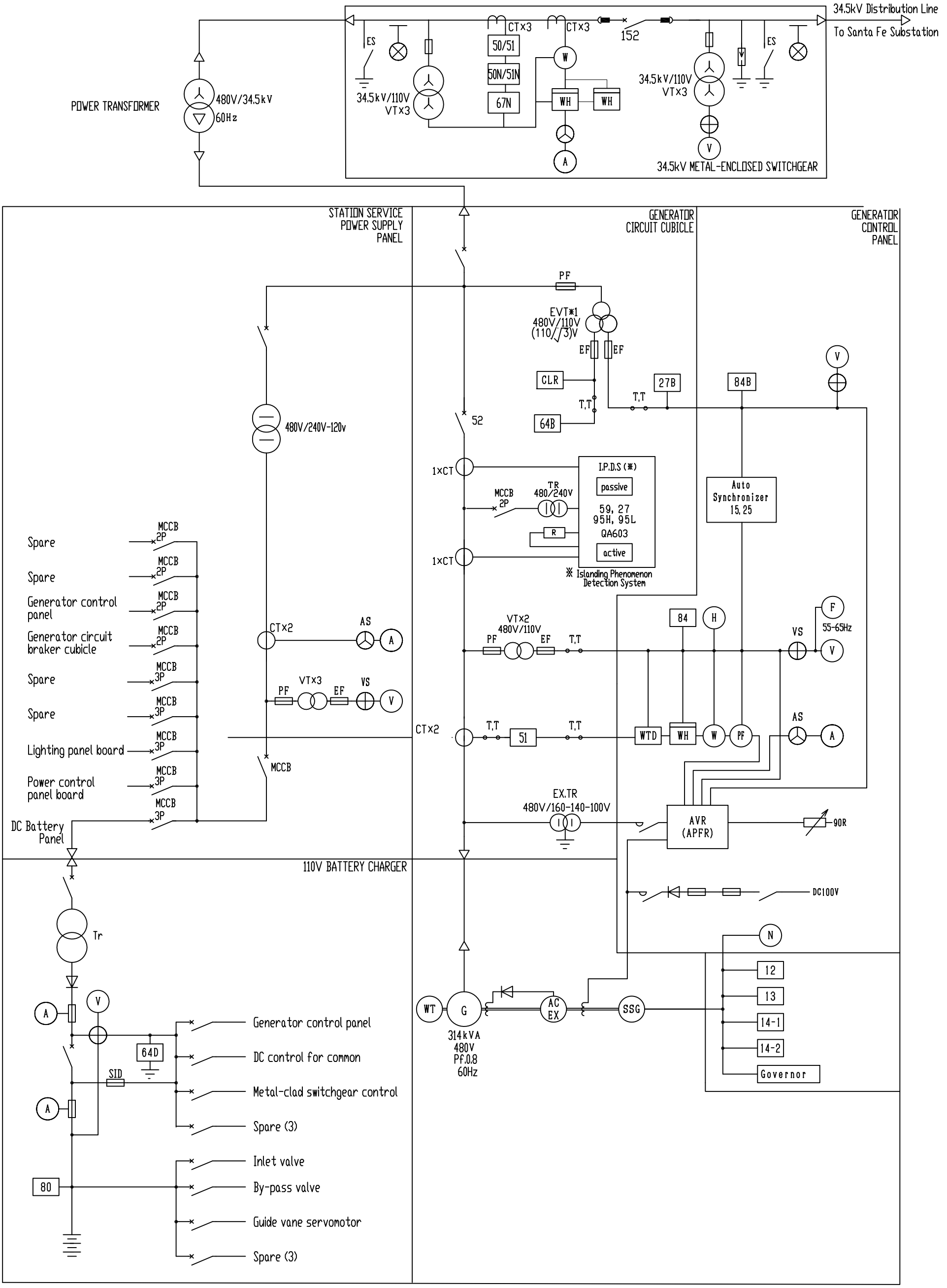
Scale1
0 5(m)

Scale2
0 1(m)

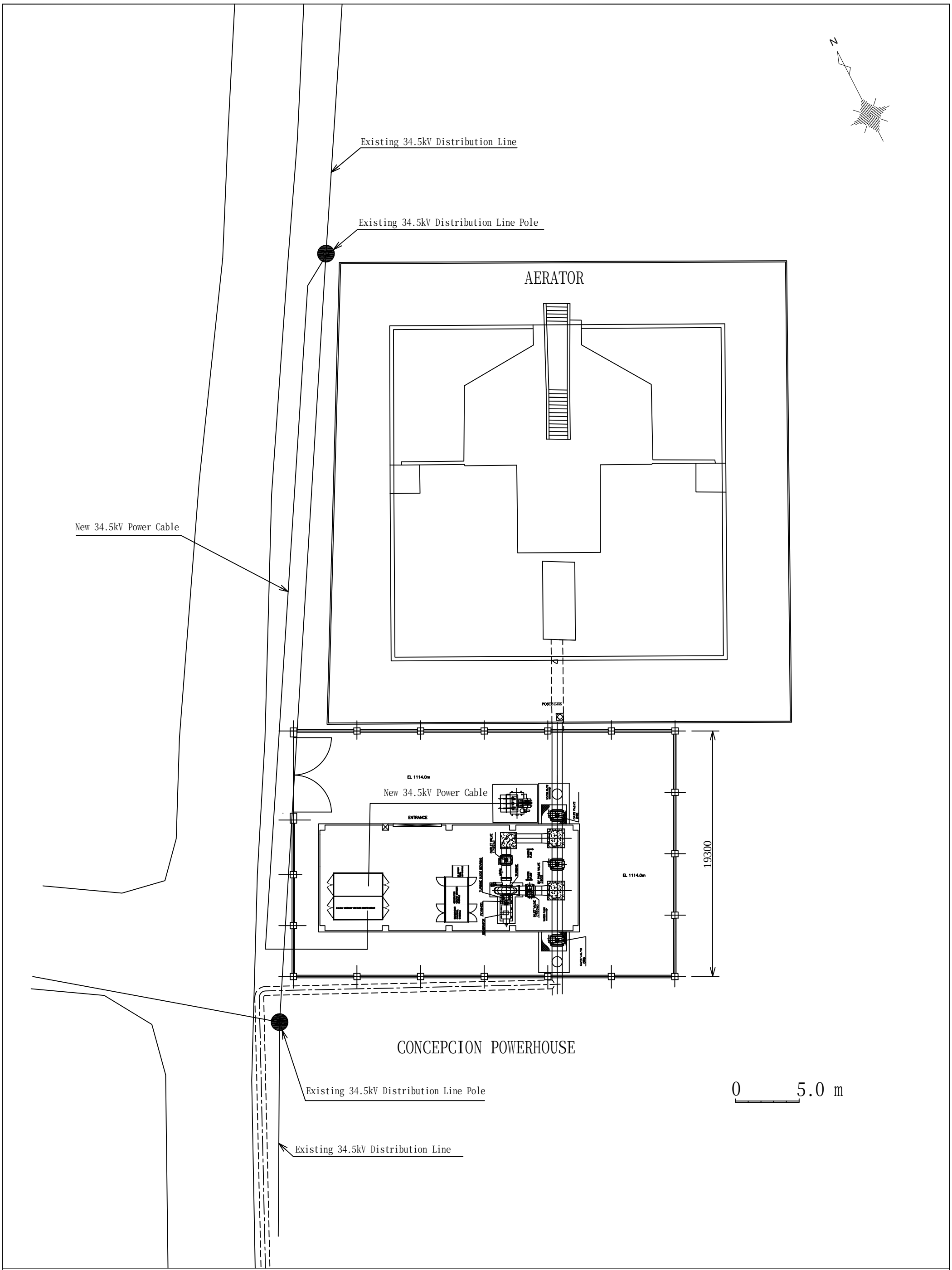
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant** **Powerhouse, Reinforcement Arrangement**	CC-CV-14
				Dec.2012



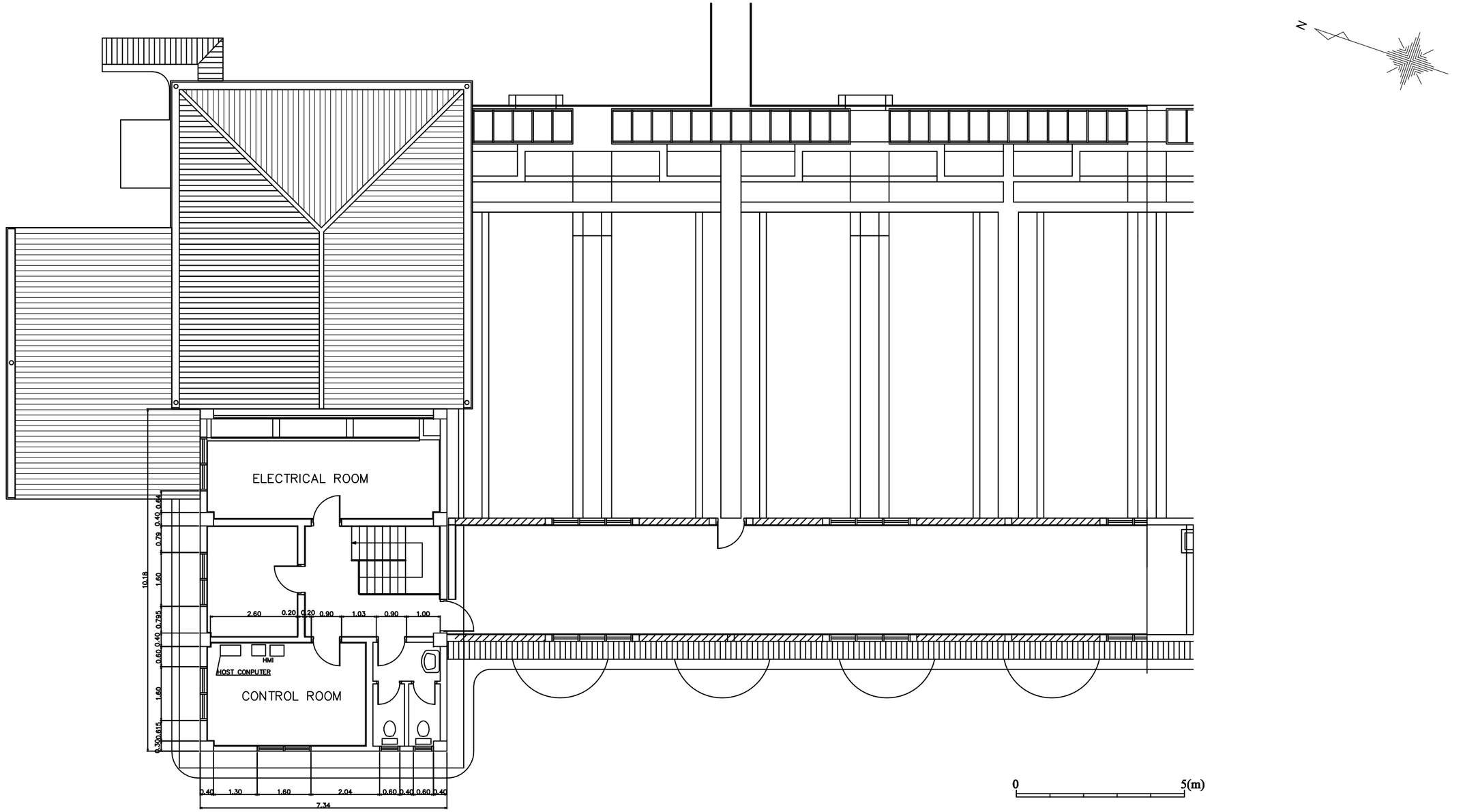
	JAPAN INTERNATIONAL COOPERATION AGENCY	**Project & Location** The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Drawing Title** **Concepcion Hydroelectric Power Plant Equipment Layout Plan**	**DWG No.** CC-EM-01 Dec. 9, 2012



JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
	The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant** **34.5kV single Line Diagram**	CC-EM-02 Dec. 9, 2012

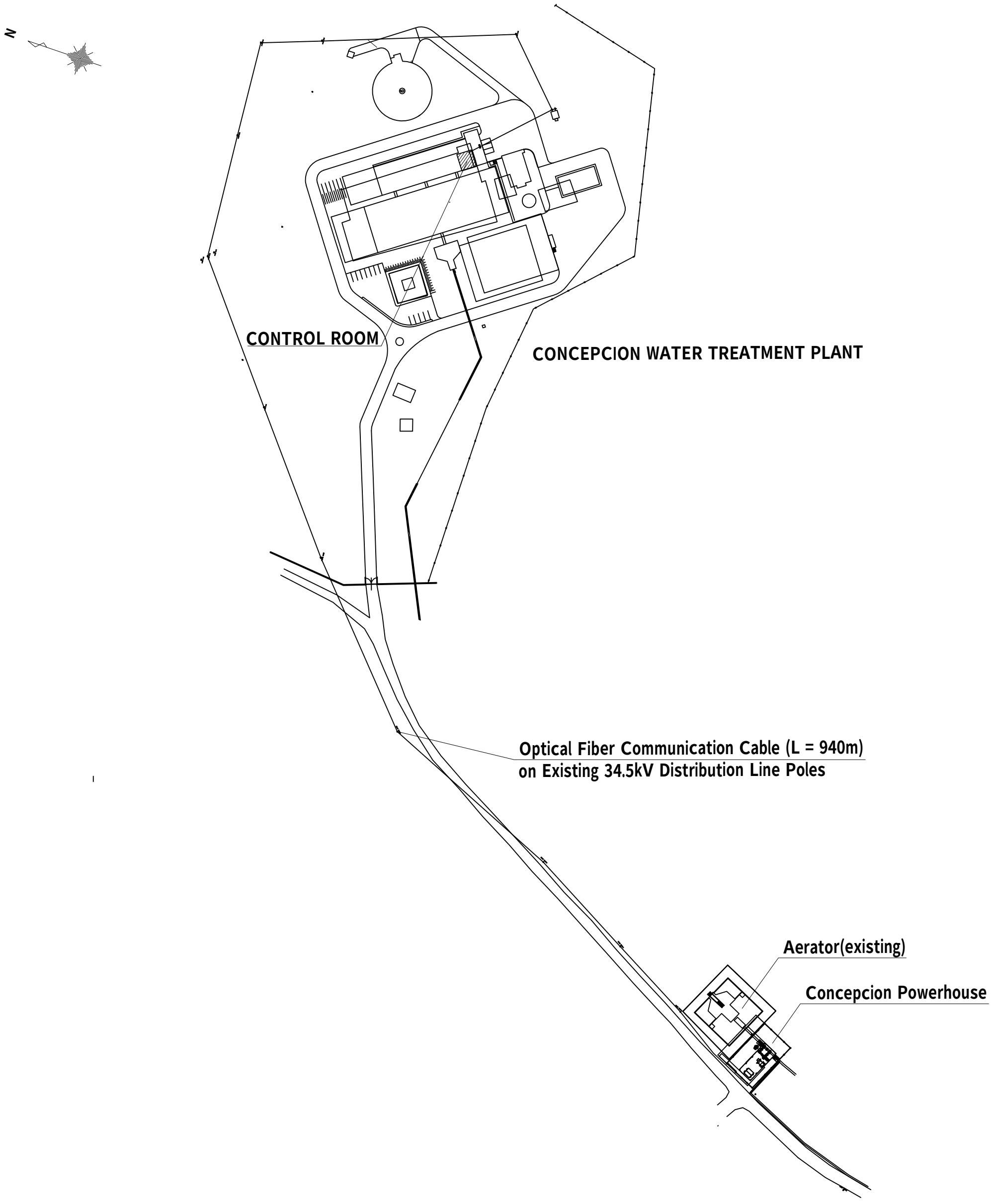


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location: The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	Drawing Title: **Concepcion Hydroelectric Power Plant 34.5kV Power Cable Route**	DWG No.: CC-EM-03 Dec. 9, 2012



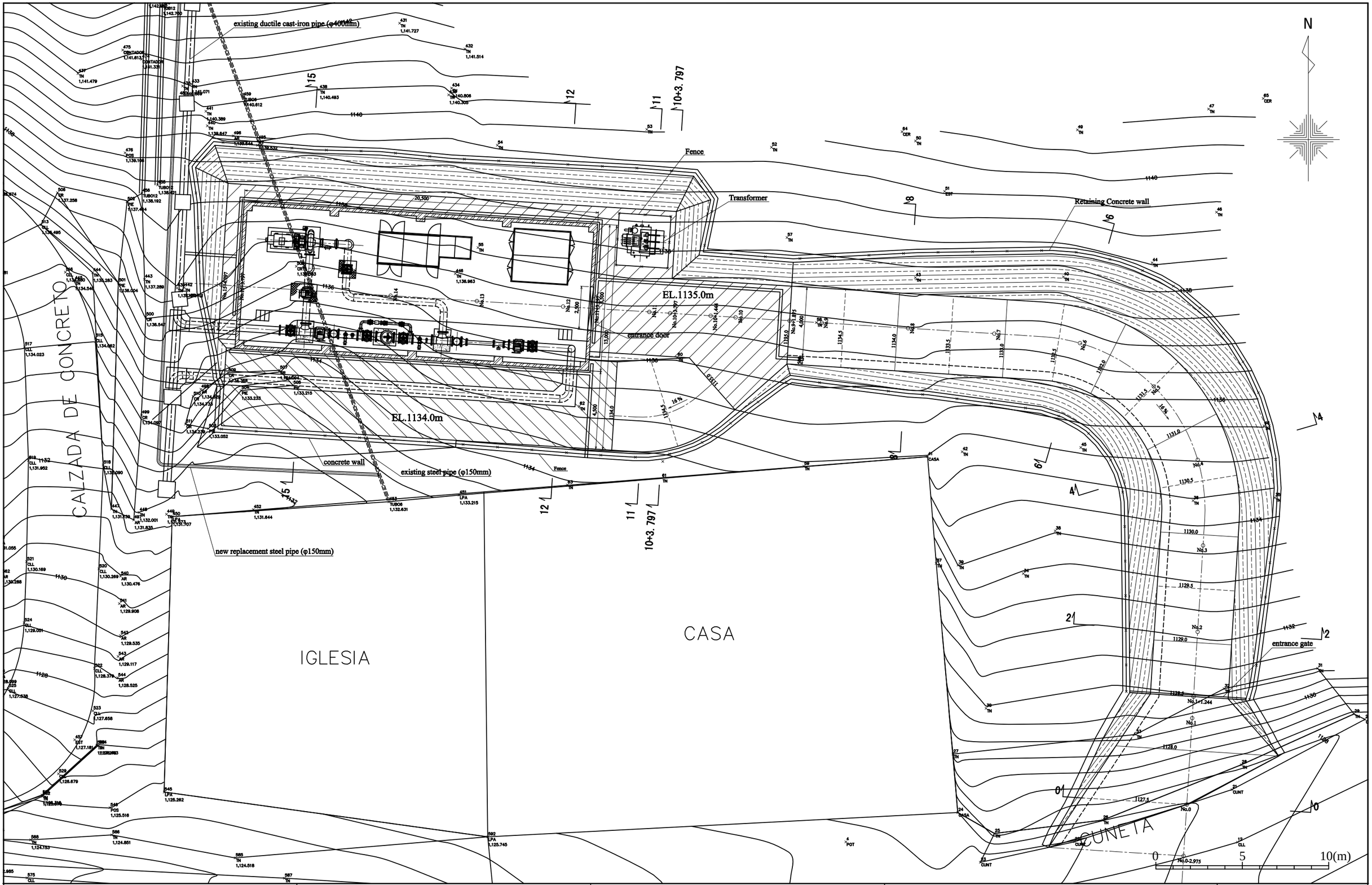
CONCEPCION WATER TREATMENT PLANT

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Control Room (Concepcion Water Treatment Plant)**	CC-EM-04
				Dec. 9, 2012



JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
	The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Concepcion Hydroelectric Power Plant Communication Cable Route**	CC-EM-05
			Dec. 9, 2012

PICACHO HYDROELECTRIC POWER PLANT



	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse Area,General plan**	PC-CV-01
				Dec.2012

N

Water flow

20,500

20,000

Fence

Retaining concrete wall

1:0.5

drain ditch

3,300

3,000

TURBINE GUIDE BEARING

GENERATOR

TURBINE

2,000

1,000

1,800

1,400

FLYWHEEL

WATER FLOW

5,400

900

900

1,900

1,800

GENERATOR CONTROL CUBICLE

GENERATOR CIRCUIT BRAKER CUBICLE

DC BATTERY PANEL /DC CUBICLE

1,200

1,300

600

1,200

3,500

3,600

1,800

50

13.8KV MEDIUM VOLTAGE SWITCHGEAR

1,000

1,500

50

3,100

3,650

Transformer

Fence

3,000

drain ditch

8,500

8,000

OUTLET VALVE (400A)

INLET VALVE (400A)

WATER FLOW

EL.1135.0m

entrance door

EL.1135.0m

hand rail

step

2,500

AIR VENT VALVE

SAFETY VALVE

EL.1134.0m

Asphalt pavement

GATE VALVE (400A)

BY-PASS VALVE (400A)

GATE VALVE (400A)

WATER FLOW METER

GATE VALVE (400A)

2,350

STRAINER (400A)

PRESSURE REDUCING VALVE (400A)

GATE VALVE (400A)

STRAINER (400A)

WATER FLOW REGULATING VALVE (400A)

drain ditch

16 %

new steel pipe (φ400mm)

concrete lining

EL.1134.0m

1:0.5

Existing steel pipe (φ150mm)

water flow

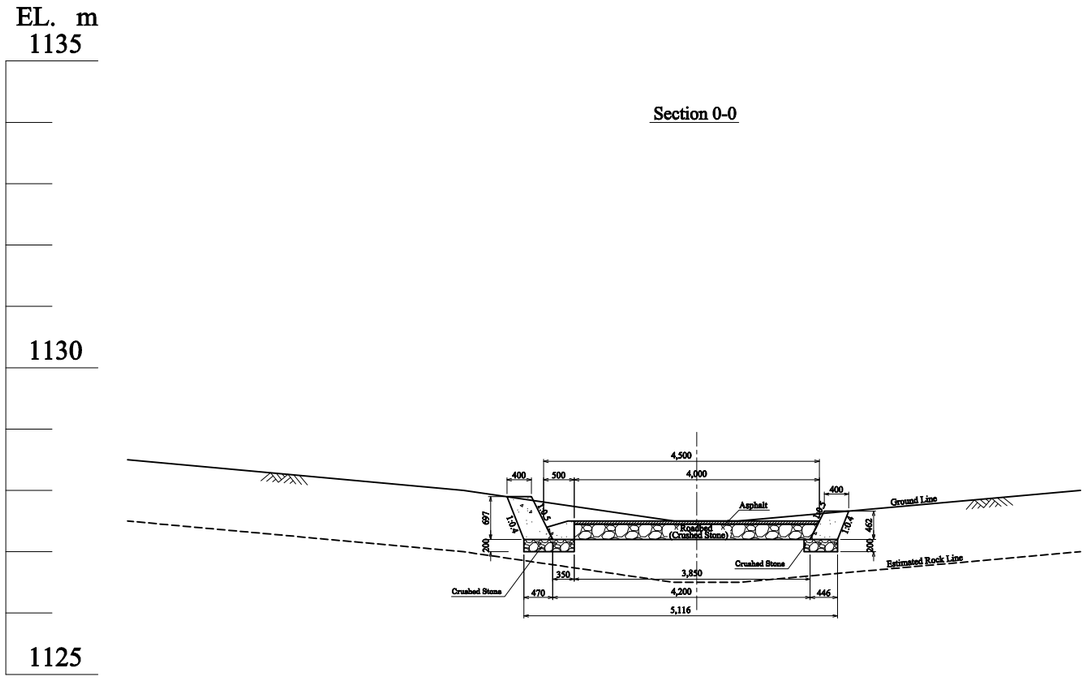
new replacement Steel Pipe (φ150mm)

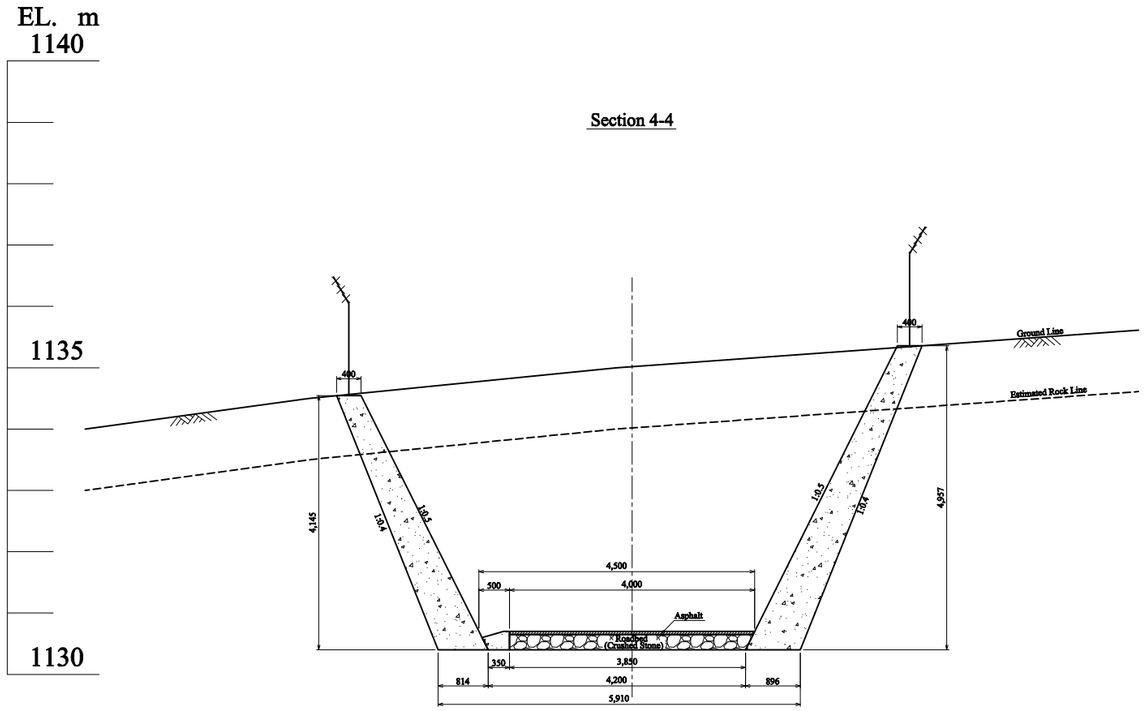
gravity concrete wall

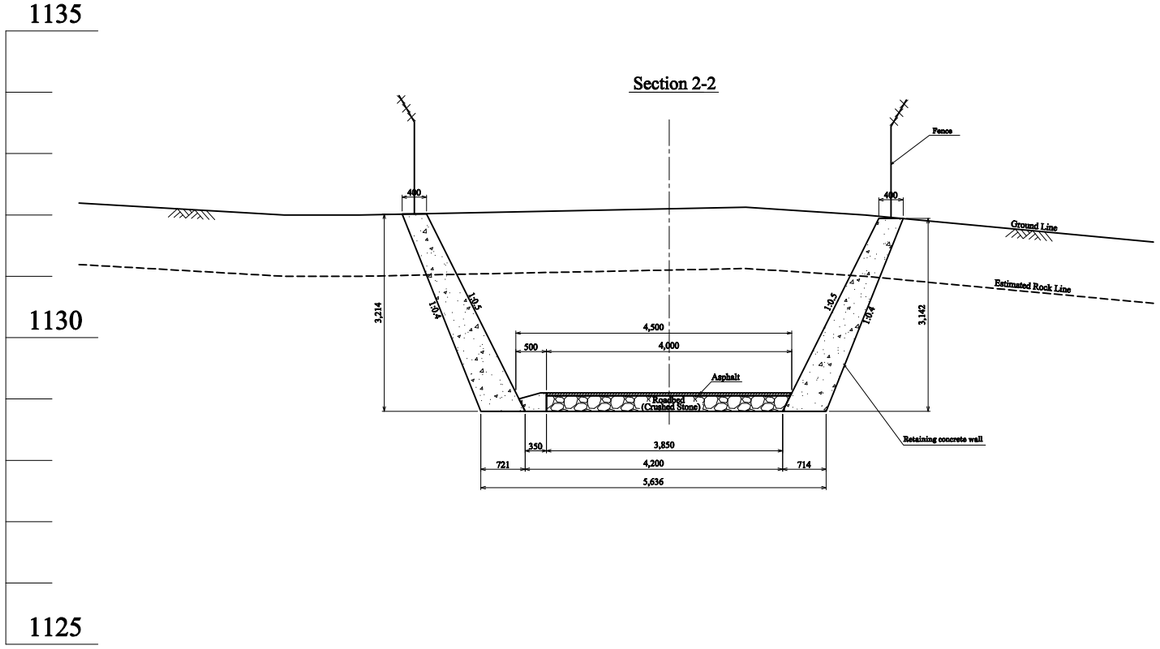
0

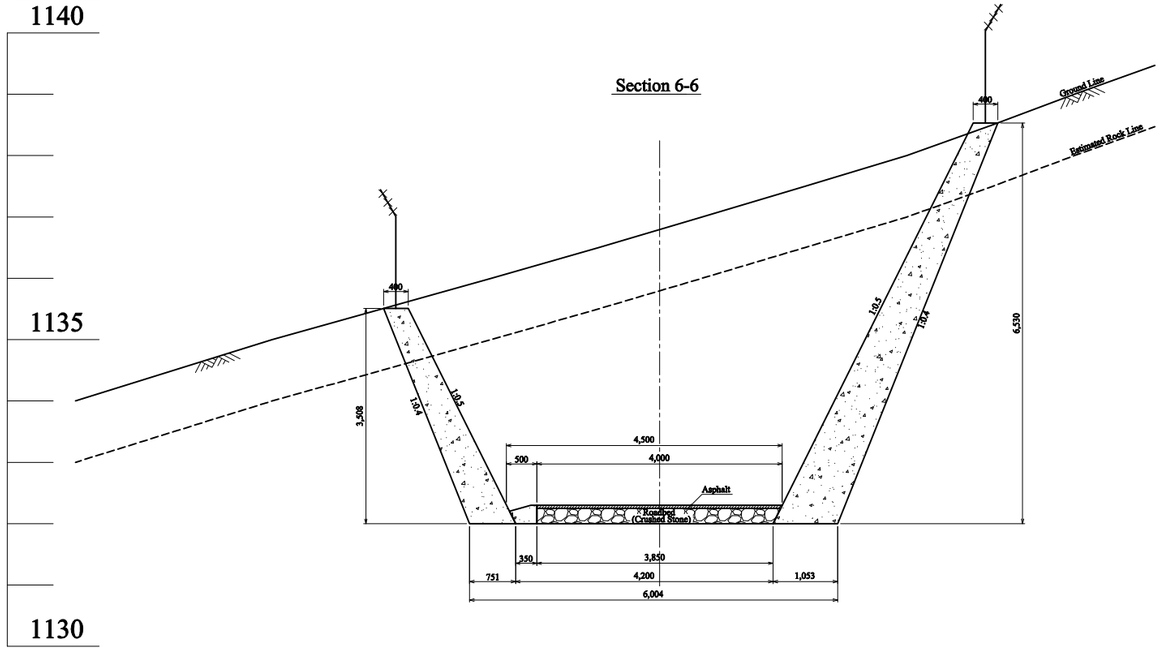
5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse,General Layout plan**	PC-CV-02
				Dec.2012



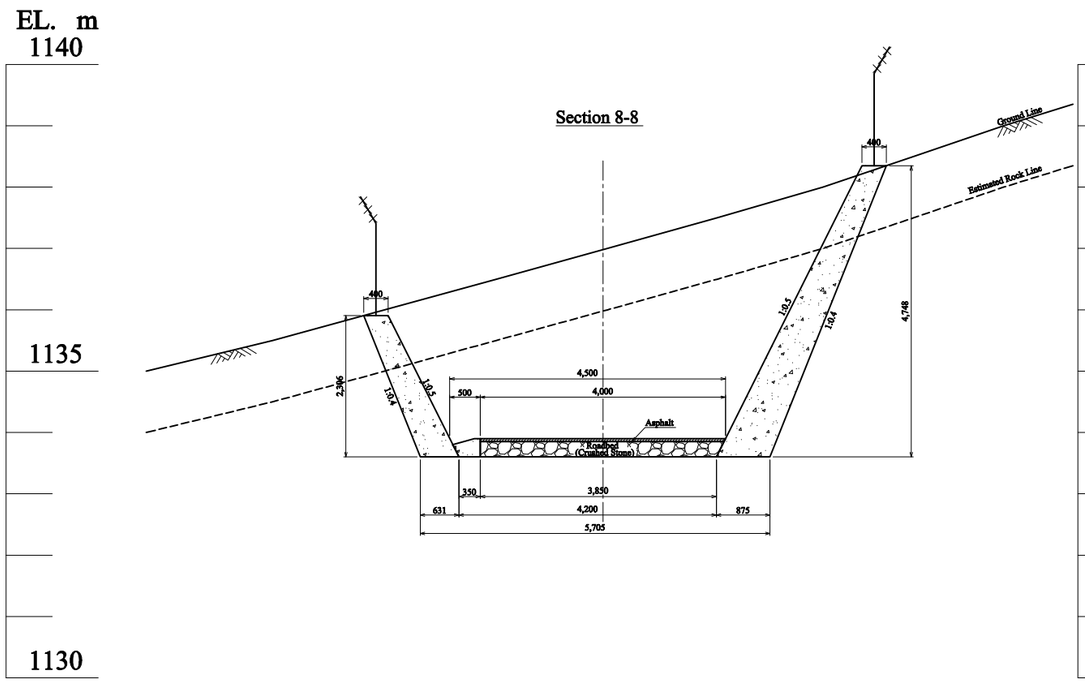


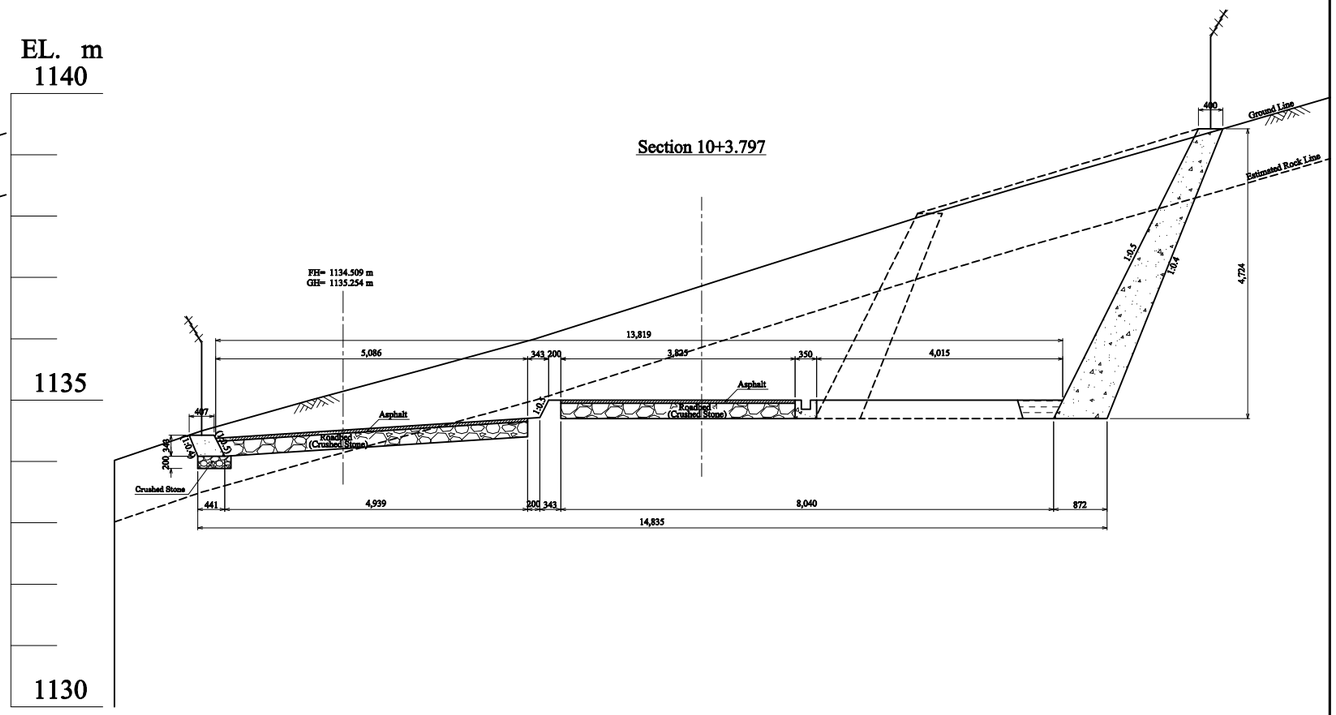


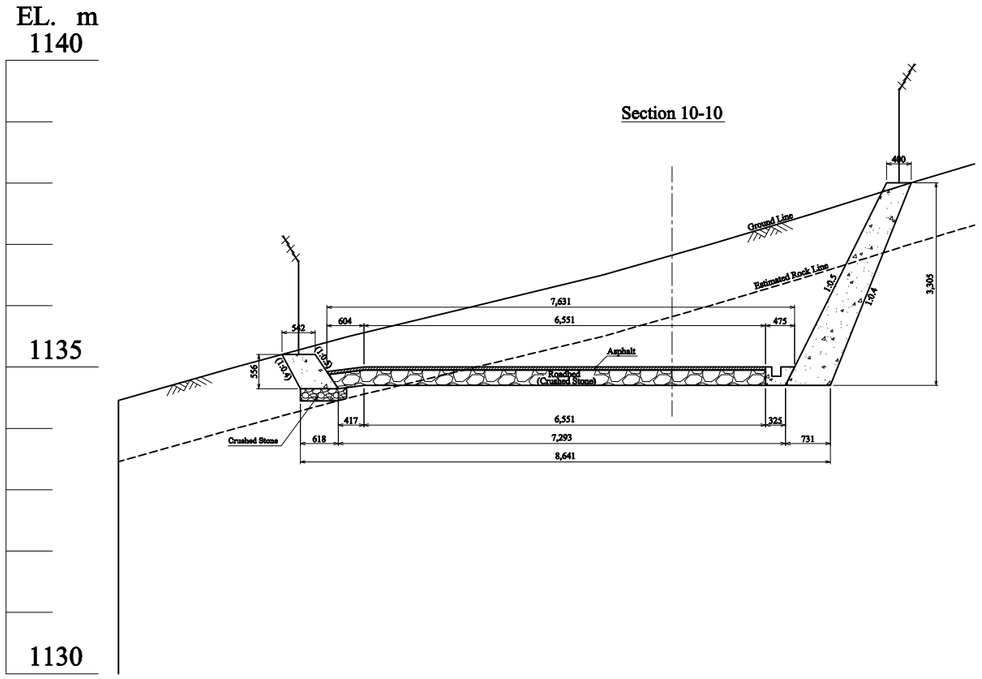


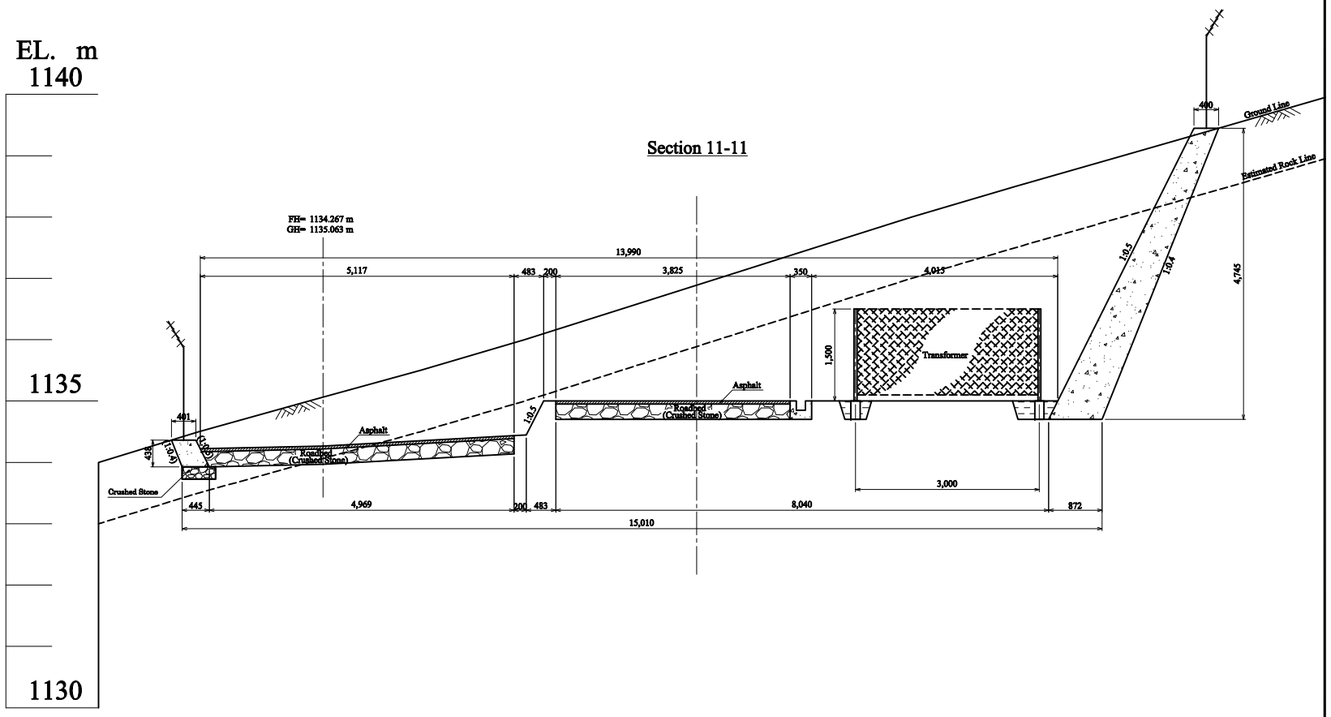
0 5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse, Sections (1/3)**	PC-CV-03
				Dec.2012





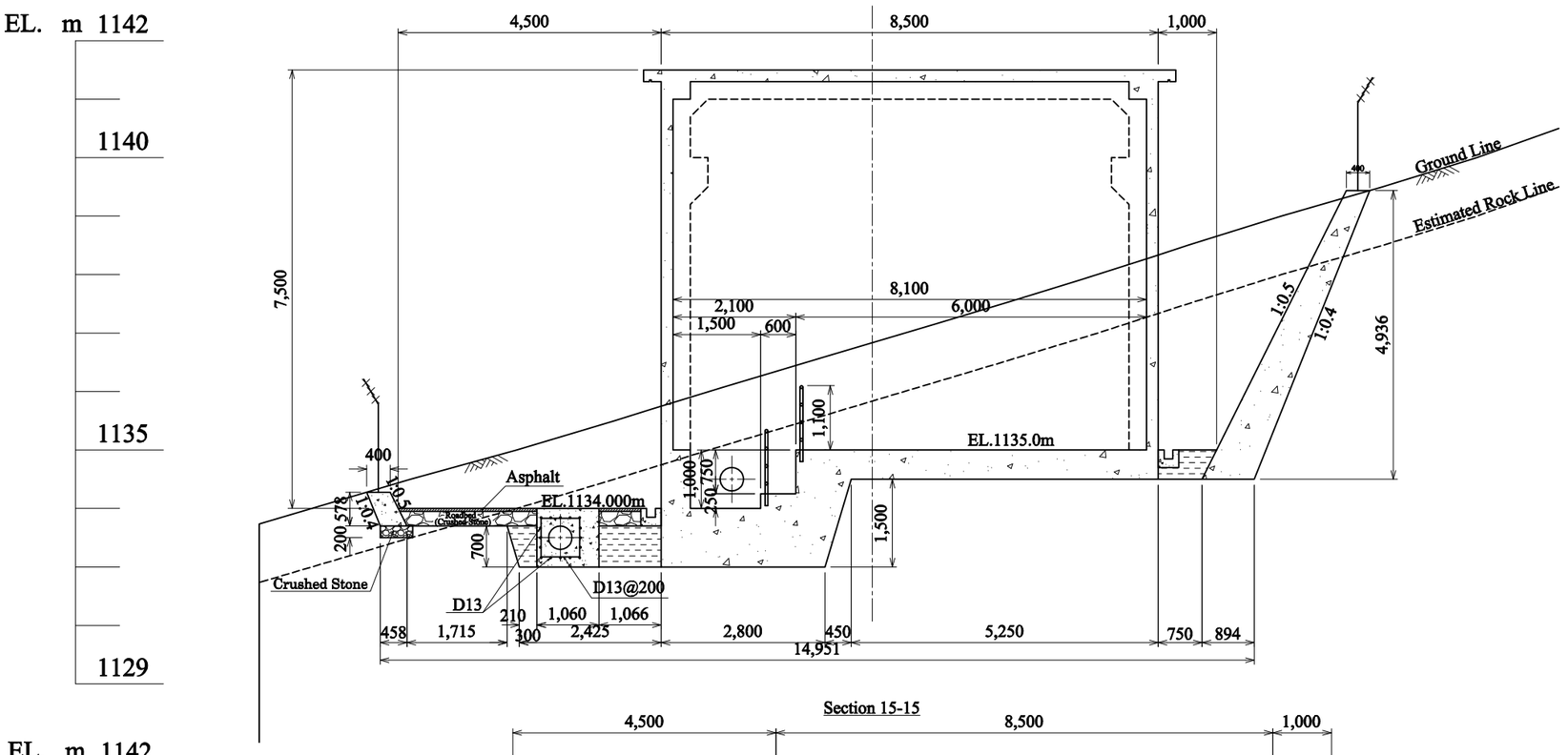




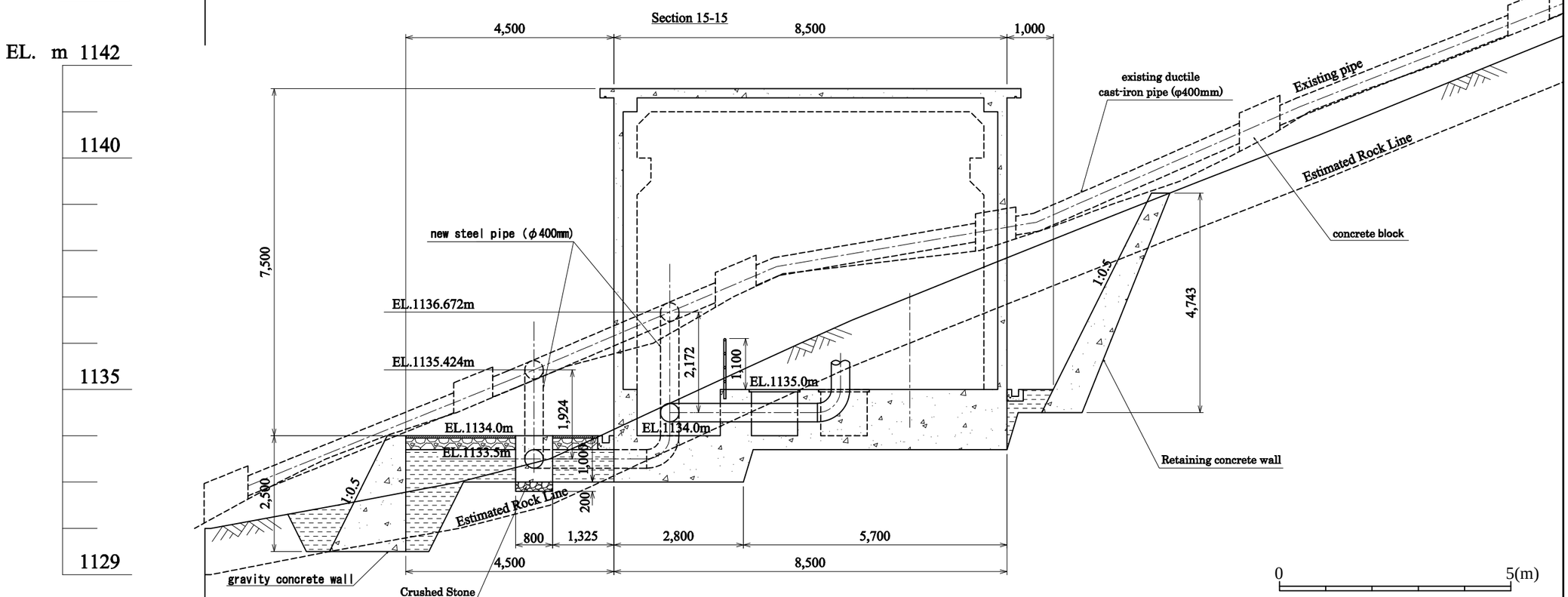
0 5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse, Sections (2/3)**	PC-CV-04
				Dec.2012

Section 12-12

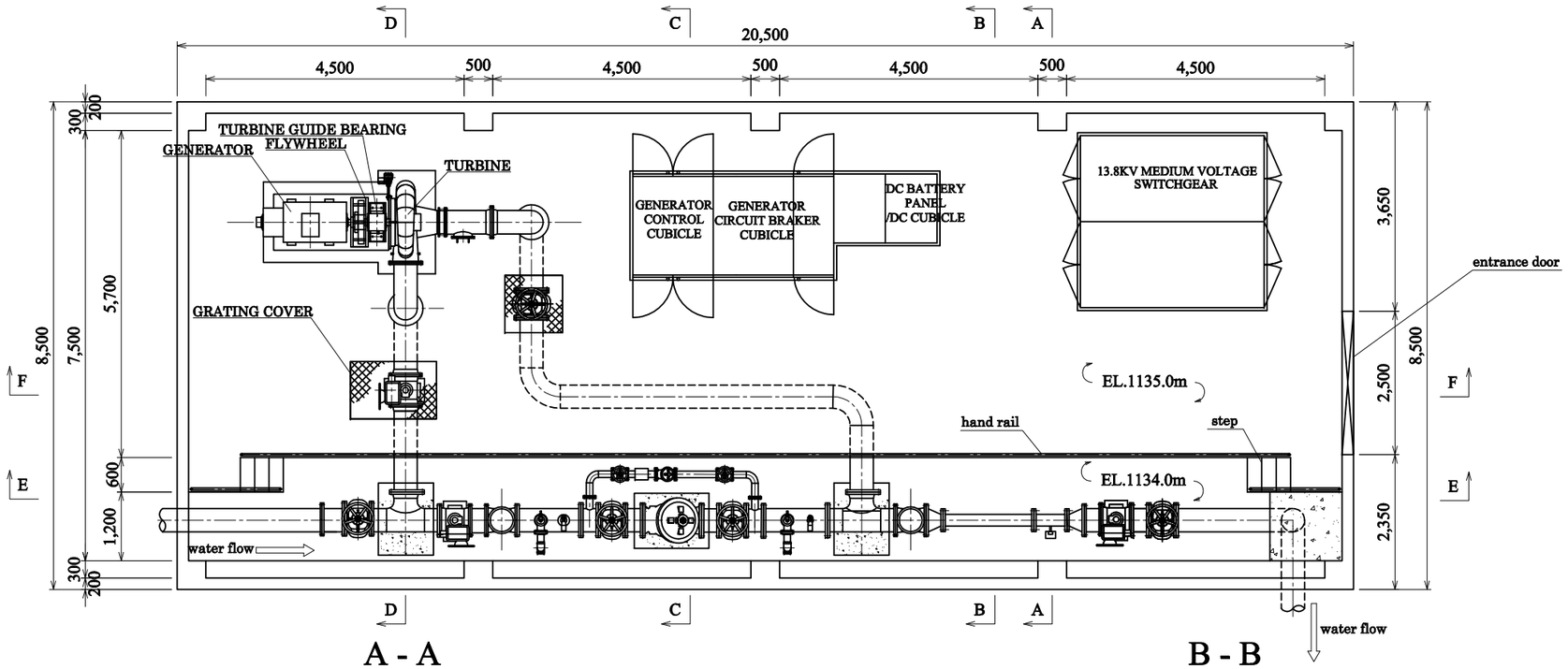


Section 15-15



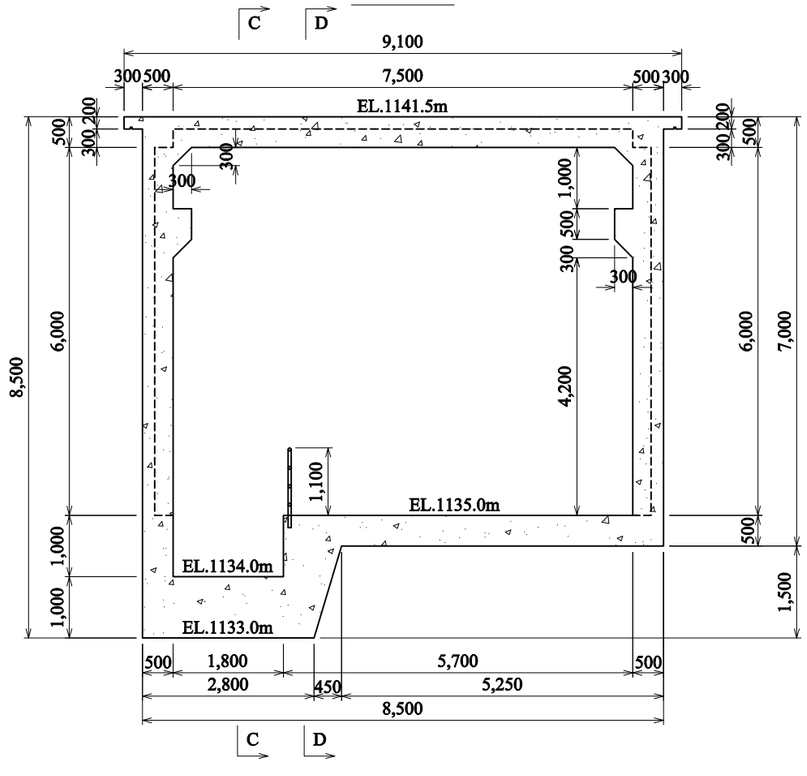
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse, Sections (3/3)**	PC-CV-05
				Dec.2012

PLAN

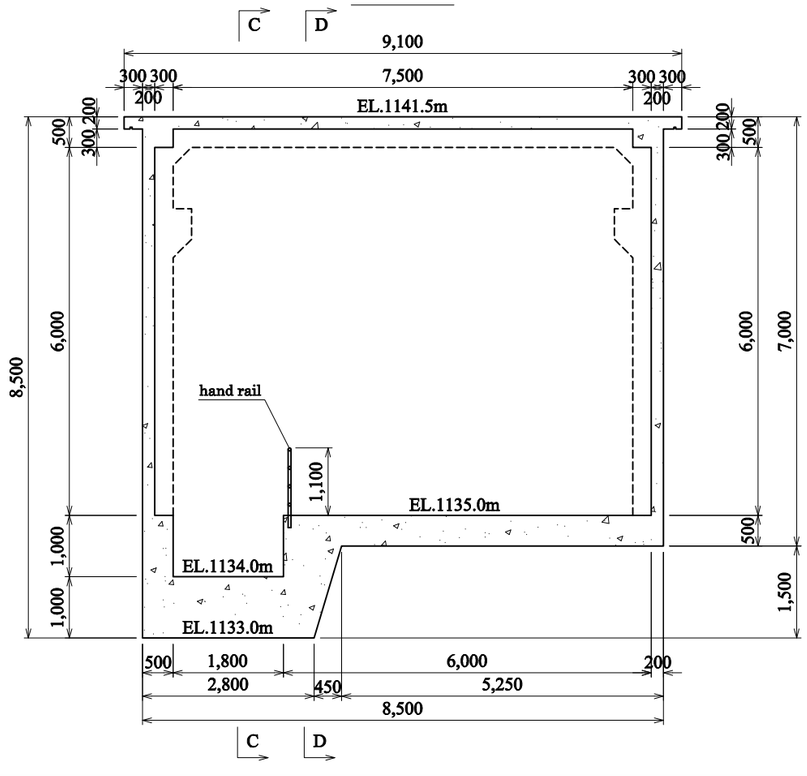


N

A - A



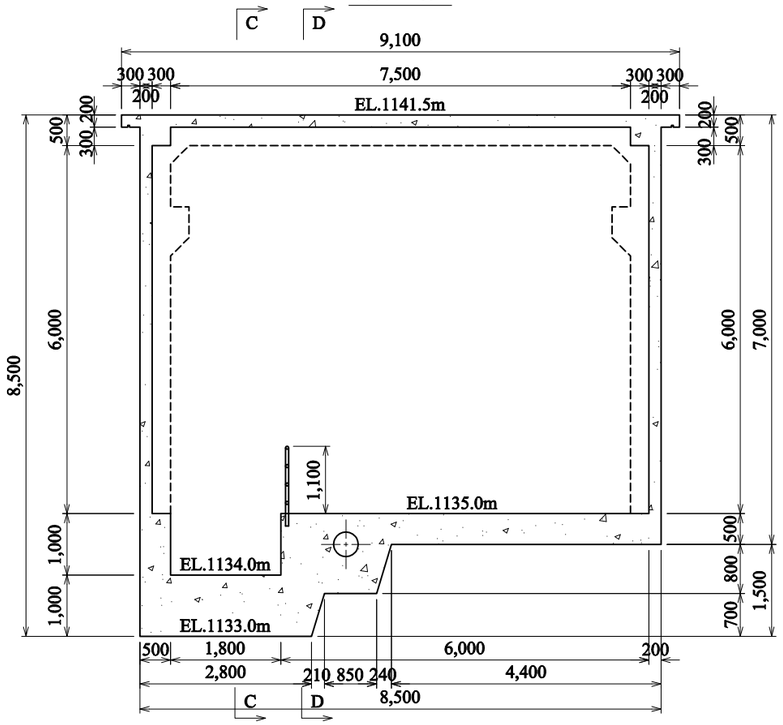
B - B



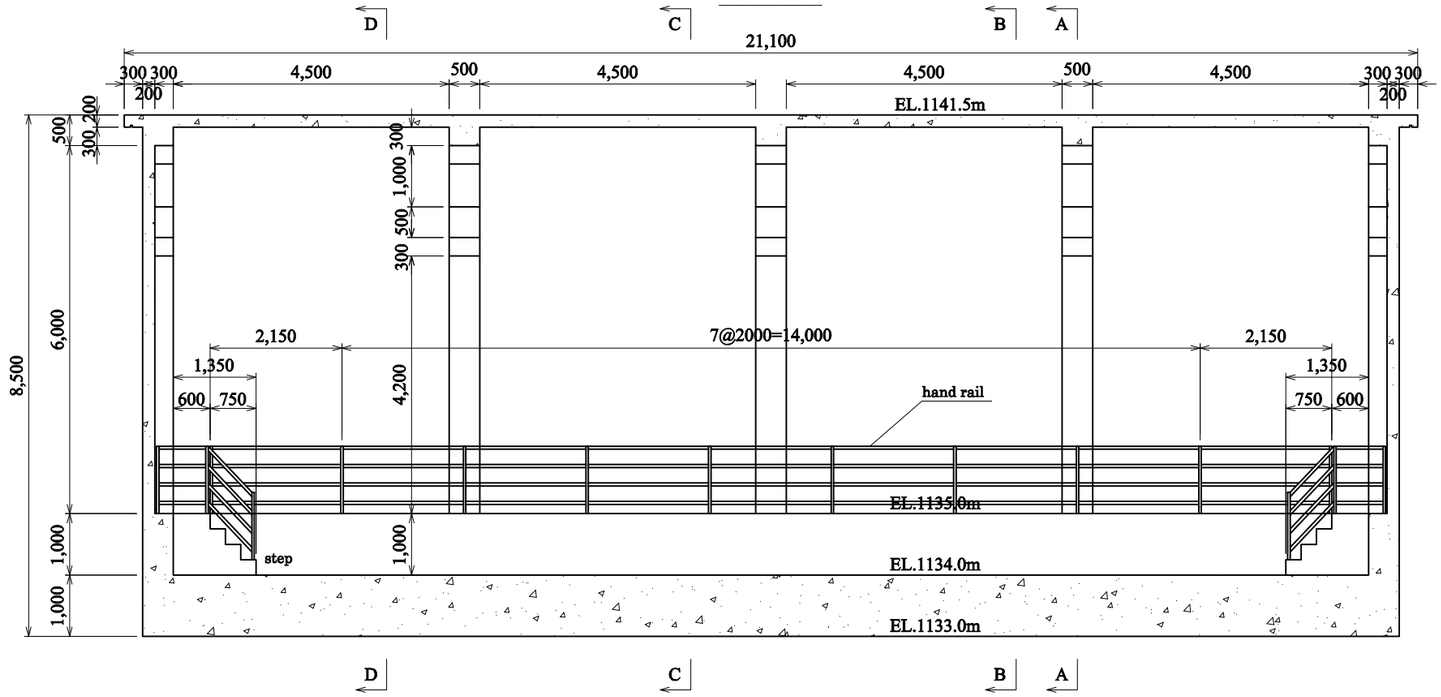
0 5(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse, Concrete Outline Plan and Sections**	PC-CV-06
				Dec.2012

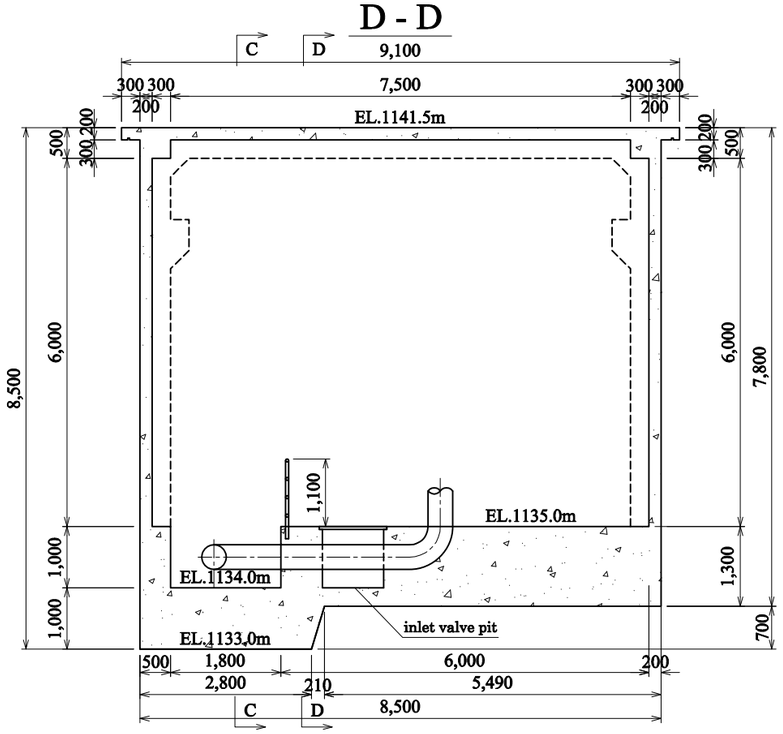
C - C



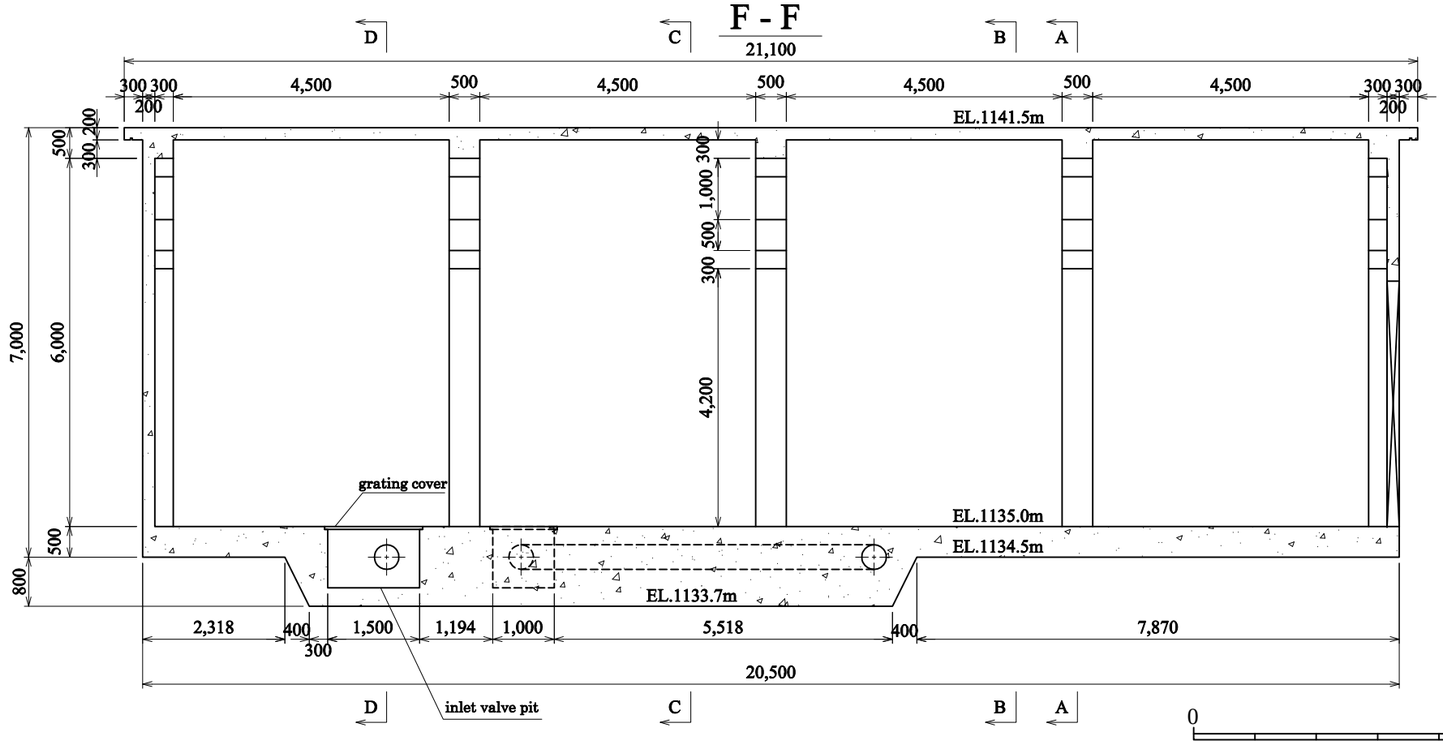
E - E



D - D

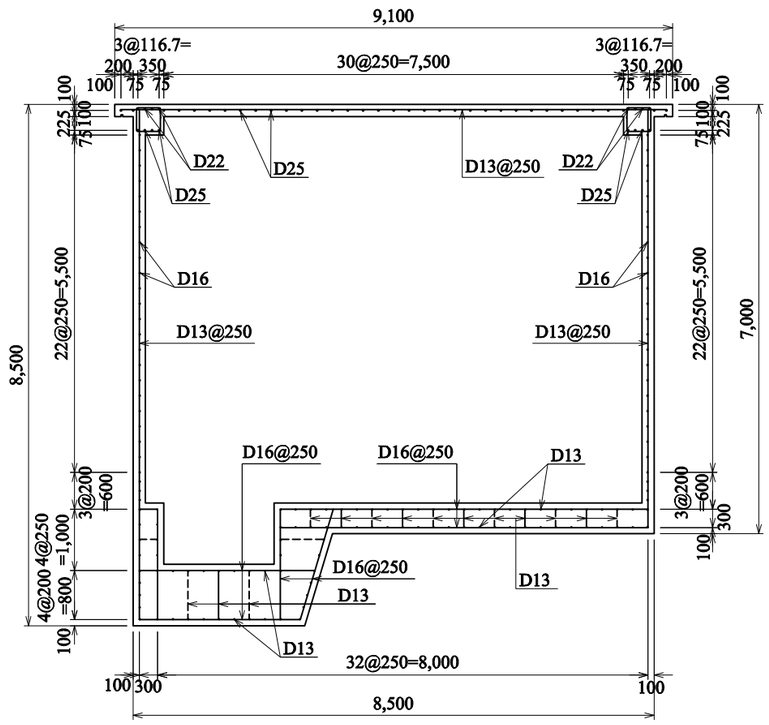


F - F

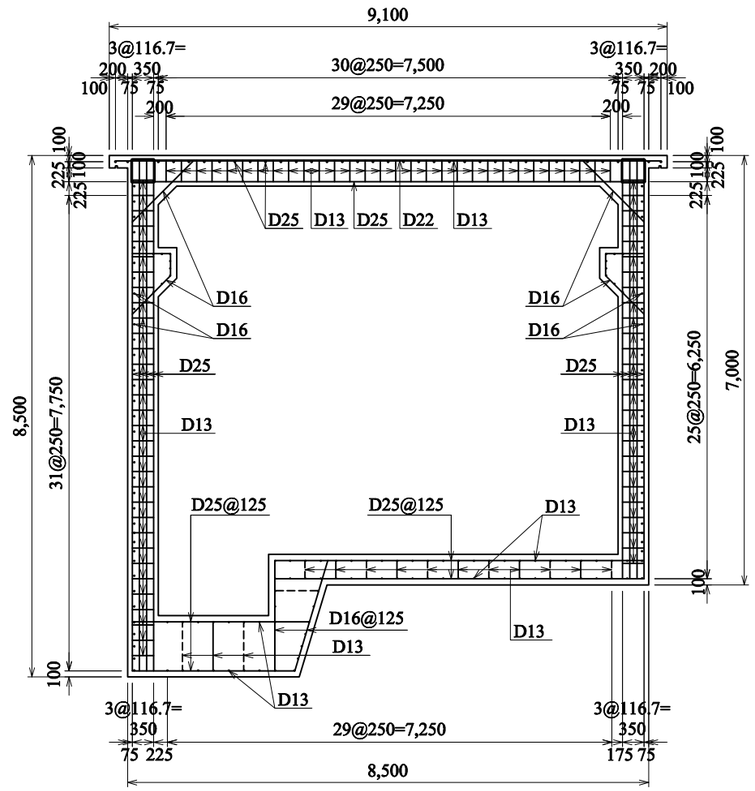


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant Powerhouse, Concrete Outline Profile and Sections**	PC-CV-07
				Dec.2012

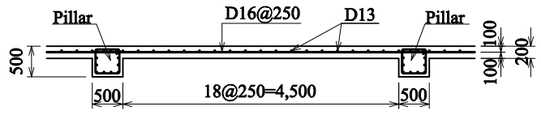
Non Pillar section
scale 1



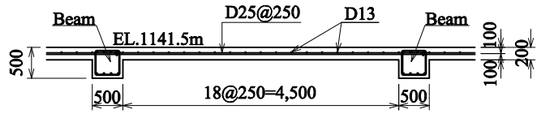
Pillar Section
scale 1



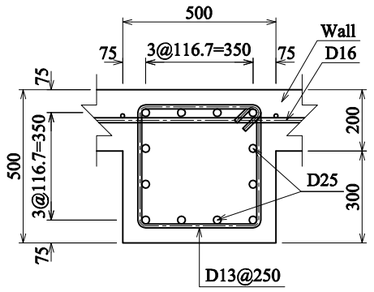
Wall Section
scale 1



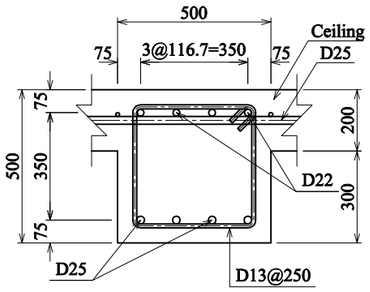
Ceiling Section
scale 1



Pillar Section
scale 2



Beam Section
scale 2



Scale1
0 5(m)

Scale2
0 1(m)

	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Plant** **POWER HOUSE, REINFORCEMENT ARRANGEMENT**	PC-CV-08 Dec.2012

N

20,500

13.8KV DISTRIBUTION LINE DEAD-END POLE

EXHAUST FAN

EXHAUST FAN

SAFETY FENCE

TURBINE GUIDE BEARING

GENERATOR

FLYWHEEL

TURBINE

5,400

900 900

GENERATOR CONTROL CUBICLE

GENERATOR CIRCUIT BRAKER CUBICLE

DC BATTERY PANEL /DC CUBICLE

1,900

1,800

1,200

1,300

600

1,200

3,500

3,600

1,800

13.8KV MEDIUM VOLTAGE SWITCHGEAR

3,650

POWER TRANSFORMER
250kVA, 480V/13.8kV

EL.1135.0m

8,500

WATER FLOW

OUTLET VALVE (400A)

INLET VALVE (400A)

WATER FLOW

EL.1135.0m

2,500

AIR VENT VALVE

AIR VENT VALVE

SAFETY VALVE

EL.1134.0m

2,350

GATE VALVE (400A)

BY-PASS VALVE (400A)

GATE VALVE (400A)

WATER FLOW METER

SAFETY VALVE

GATE VALVE (400A)

STRAINER (400A)

PRESSURE REDUCING VALVE (400A)

GATE VALVE (400A)

STRAINER (400A)

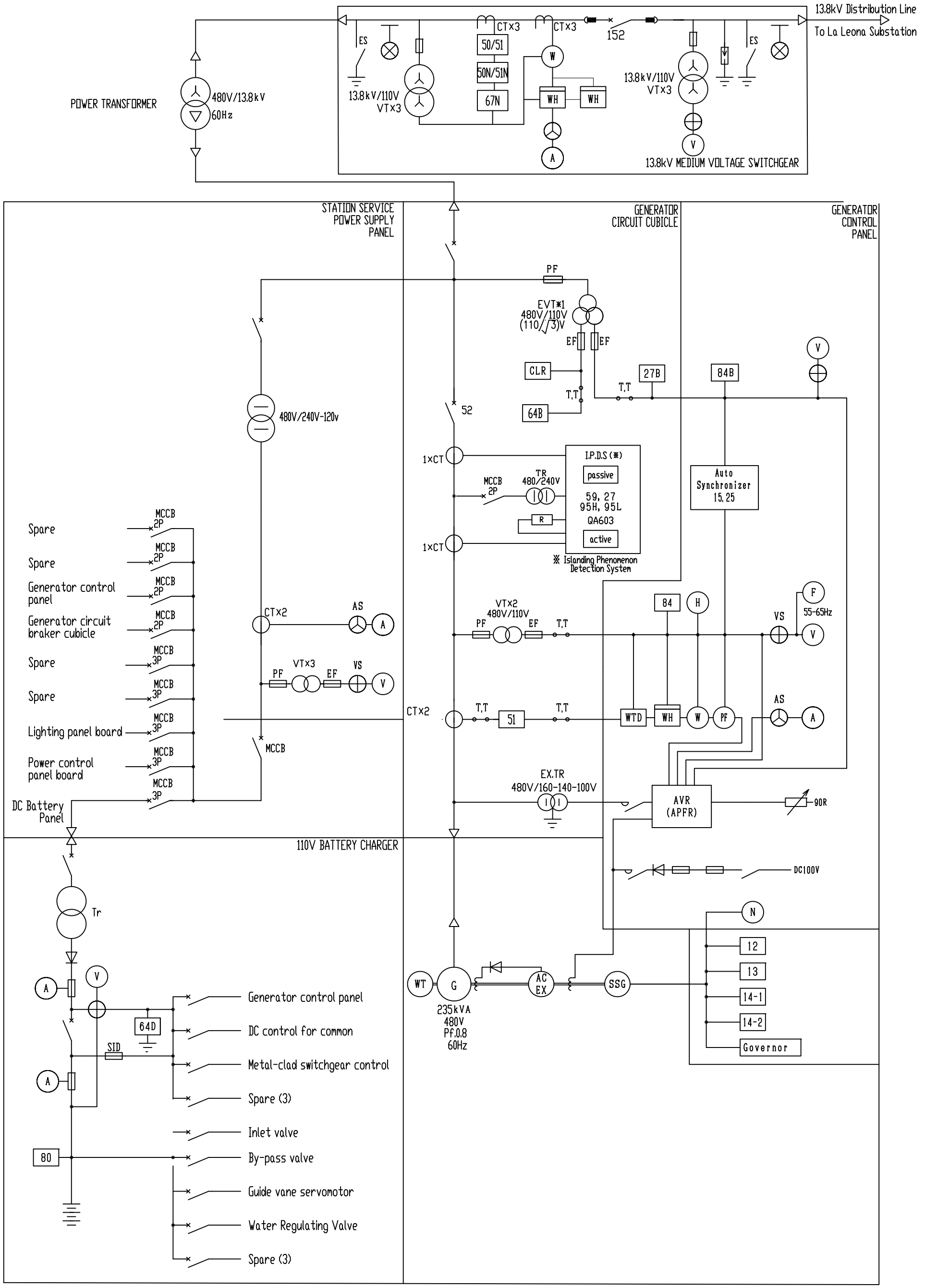
WATER FLOW REGULATING VALVE (400A)

16 %

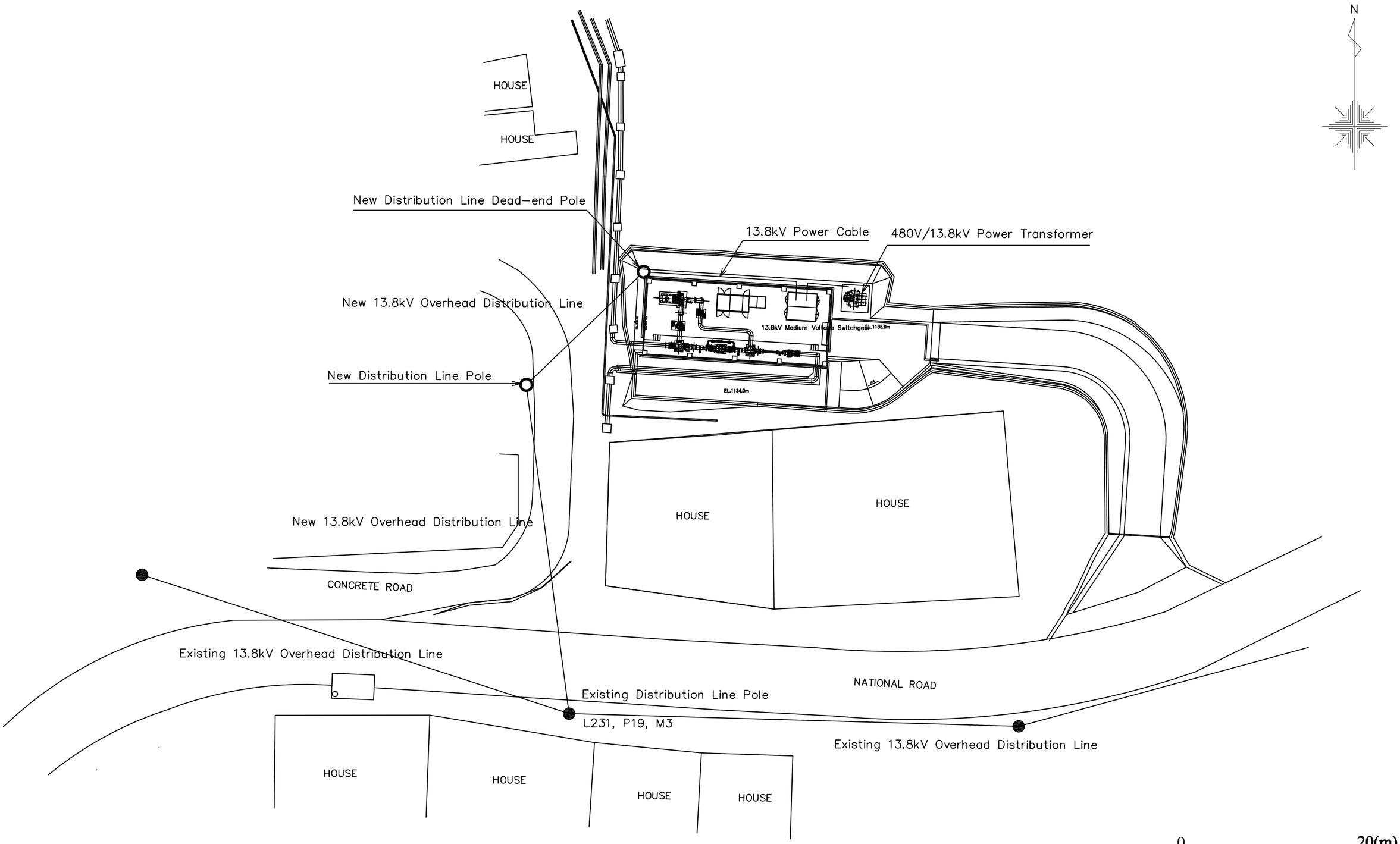
EL.1134.0m

0 5(m)

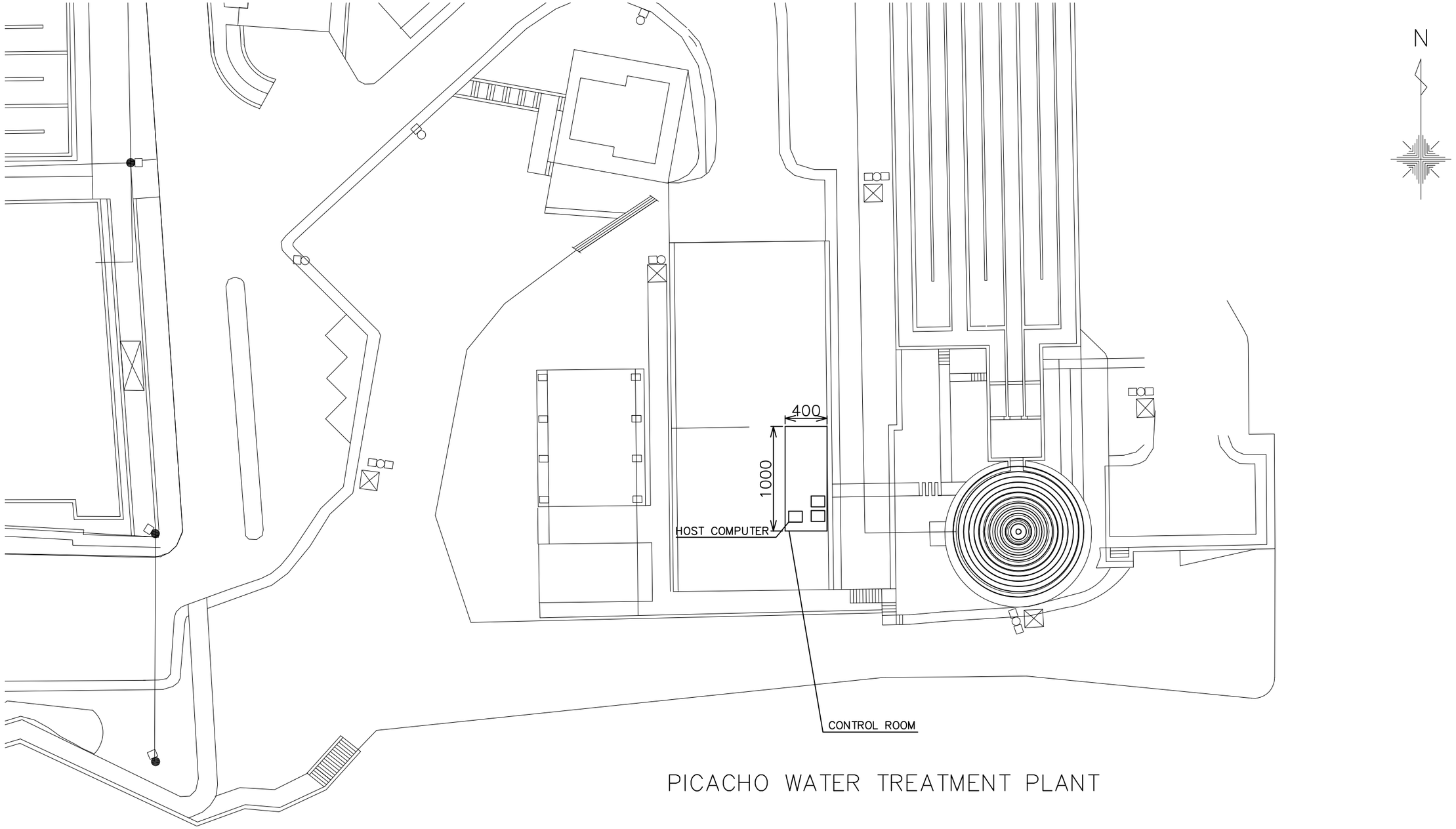
	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Prant Equipment Layout Plan**	PC-EM-01
				Dec. 9, 2012



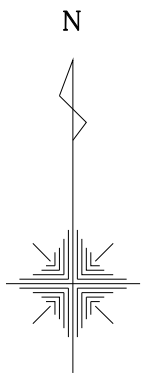
JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
	The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Prant 13.8kV Single Line Diagram**	PC-EM-02
			Dec. 9, 2012

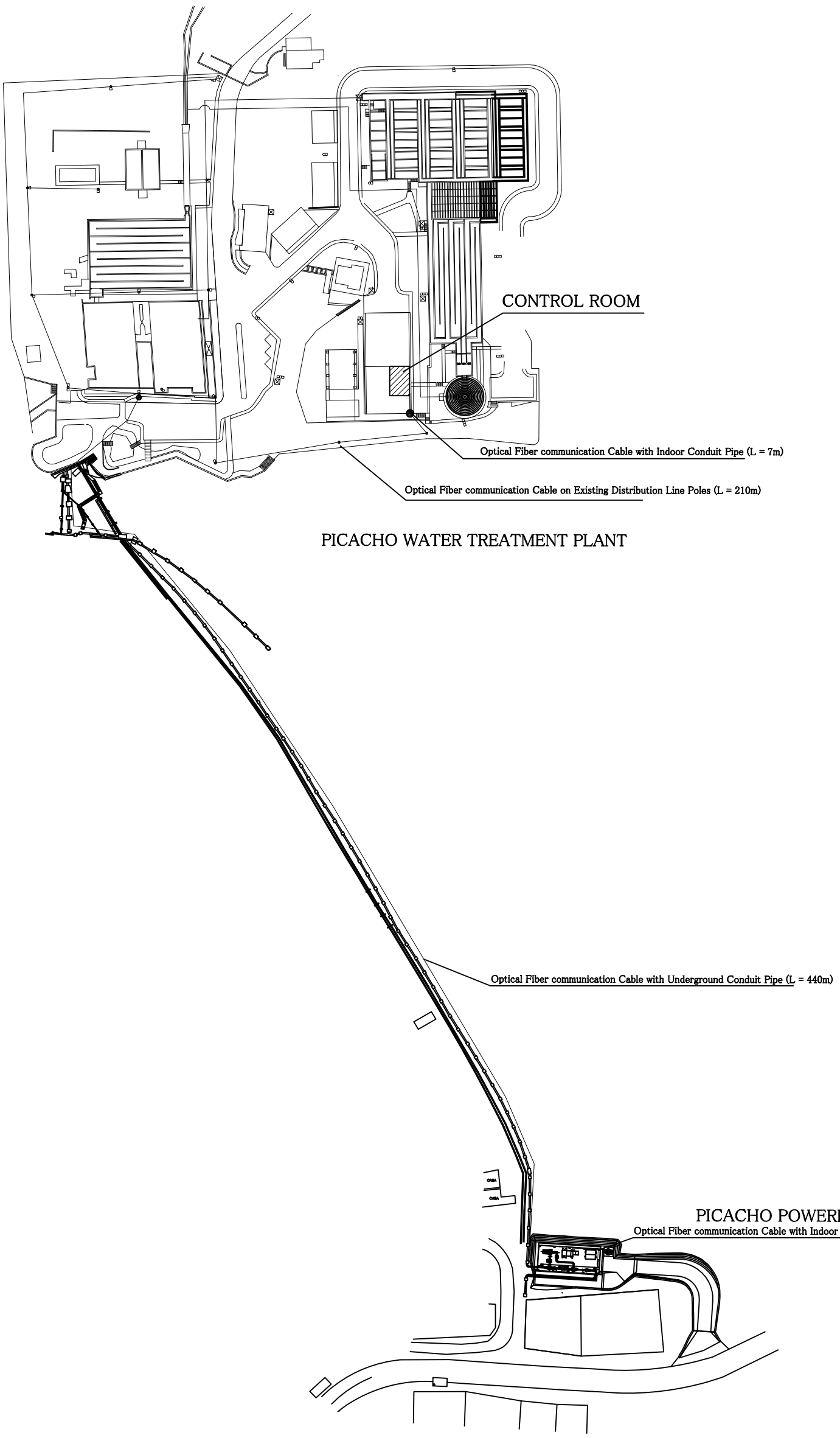


	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Prant 13.8kV Power Cable and Distribution Line Routes**	PC-EM-03
				Dec. 9, 2012



	JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
		The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Prant Control Room (Picacho Water Treatment Plant)**	PC-EM-04
				Dec. 9, 2012





JAPAN INTERNATIONAL COOPERATION AGENCY	Project & Location	Drawing Title	DWG No.
	The Preparatory Survey for the Project of Micro- Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras	**Picacho Hydroelectric Power Prant Communication Cable Route**	PC-EM-05
			Dec. 9, 2012

APPENDICES

1. Member List of the Study Team
2. Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions (M/D)
5. Soft Component (Technical Assistance) Plan
6. References

1. Member List of the Study Team

Member of the Study Team

1st Site Survey

Name	Assignment	Organization
Mr. Shigeru MAEDA	Team Leader	Technical Advisor to Director General Industrial Development and Public Policy Department, JICA
Ms. Chiyoko MIYATA	Planning Management	Energy and Mining Division, Industrial Development and Public Policy Department, JICA
Mr. Yuichi SANO	Chief Consultant / Electric Power, Operation & Maintenance, Management Planning	NEWJEC Inc.
Mr. Kazuhiro ARITA	Construction Planning	JAPAN TECHNO Co., Ltd.
Mr. Shigeru TSUNEKI	Electro-Mechanical Equipment / Protection & Control Planning	NEWJEC Inc.
Mr. Toshiki HORIE	Material and Equipment Procurement Planning / Cost Estimate	JAPAN TECHNO Co., Ltd.
Ms. Rumi KATO	Environmental / Social Consideration	NEWJEC Inc.
Mr. Fumio TAKEZAWA	Civil Facilities Planning / Design	OT Sekkei Inc.
Mr. Akihiro MINAGI	Natural Condition Survey	NEWJEC Inc.
Mr. Akio OKAMURA	Interpreter	TECHNO STAFF Inc.

2nd Site Survey

Name	Assignment	Organization
Mr. Shigeru MAEDA	Team Leader	Technical Advisor to Director General Industrial Development and Public Policy Department, JICA
Ms. Chiyoko MIYATA	Planning Management	Energy and Mining Division, Industrial Development and Public Policy Department, JICA
Mr. Yuichi SANO	Chief Consultant / Electric Power, Operation & Maintenance, Management Planning	NEWJEC Inc.
Mr. Kazuhiro ARITA	Construction Planning	JAPAN TECHNO Co., Ltd.
Mr. Shigeru TSUNEKI	Electro-Mechanical Equipment / Protection & Control Planning	NEWJEC Inc.
Mr. Akio OKAMURA	Interpreter	TECHNO STAFF Inc.

2. Study Schedule

Study Schedule

1st Site Survey

No	Date	Day	JICA		Consultant							
			Leader	Project Coordinator	Chief Consultant / Electric Power, Operation and Maintenance Management Planning	Construction Planning	Electro-Mechanical Equipment and Protection and Control system Planning	Material and Equipment Procurement Planning /Cost Estimates	Environmental and Social Consideration	Civil Facilities Planning /Design	Natural Condition Survey	Interpreter
			Mr.Shigeru Maeda/ JICA	Ms.Chiyoko Miyata/ JICA	Mr.Yuichi Sano/ NEWJEC Inc.	Mr. Kazuhiro Arita/ JAPAN TECHNO Co., Ltd.	Mr. Shigeru Tsuneki/ NEWJEC Inc.	Mr. Toshiki Horie/ JAPAN TECHNO Co., Ltd.	Ms. Rumi Kato/ NEWJEC Inc.	Mr. Fumio Takezawa OT Sekkei Co., Ltd.	Mr. Akihiro Minagi/ NEWJEC Inc.	Mr. Akio Okamura/ TECHNO STAFF Co., Ltd.
1	2012/8/8	Wed			15:45 Narita (DL296) - 15:05 Atlanta							
2	2012/8/9	Thu			10:00 Atlanta (DL849) - 11:42 Tegucigalpa PM Meeting with JICA						10:40 Guatemala (TA701) - 12:08 Tegucigalpa PM Meeting with JICA	
3	2012/8/10	Fri			Courtesy call to Visit to survey company Site Visit (Picacho)						Courtesy call to Visit to survey company Site Visit (Picacho)	
4	2012/8/11	Sat			Site Visit (Concepcion)	15:45 Narita (DL296) - 15:05 Atlanta			15:45 Narita (DL296) - 15:05 Atlanta		Site Visit (Concepcion)	15:45 Narita (DL296) - 15:05 Atlanta
5	2012/8/12	Sun	Haneda 00:45 - 19:10 Los Angels (at Aug.11) (DL636) Los Angels 22:40 - 06:50 Atlanta (DL2354) Atlanta10:00 - 11:42 Tegucigalpa (DL849) Internal Meeting		Internal Meeting	10:00 Atlanta (DL849) - 11:42 Tegucigalpa Internal Meeting			10:00 Atlanta (DL849) - 11:42 Tegucigalpa Internal Meeting		Internal Meeting	10:00 Atlanta (DL849) - 11:42 Tegucigalpa Internal Meeting
6	2012/8/13	Mon	Meeting with JICA Courtesy call and Meeting with Tegcigalpa Municipality Office,SANAA and ENEE						Meeting with JICA Courtesy call and Meeting with Tegcigalpa Municipality Office ,SANAA and ENEE		Meeting with JICA Courtesy call and Meeting with Tegcigalpa Municipality Office,SANAA and ENEE	
7	2012/8/14	Tue	Courtesy Call and Meeting with SERNA Site Visit to Picacho and Concepcion Water Treatment Plants				12:56 San Jose (DL412) - 18:59 Atlanta		Courtesy Call and Meeting with SERNA Site Visit to Picacho and Concepcion		Courtesy Call and Meeting with SERNA Site Visit to Picacho and Concepcion Water Treatment Plants	
8	2012/8/15	Wed	Courtesy Call and Meeting with ENEE Courtesy Call and Meeting with SEPLAN Discussion on Project component and Minutes of Discussions (M/D) with SANAA Explanation of Inception Report to SANAA			Site Visit	10:00 Atlanta (DL849) - 11:42 Tegucigalpa		Courtesy Call and Meeting with ENEE and SEPLAN Discussion on M/D with Explanation of Inception Report to SANAA		Site survey, Preparation for Topo. Survey	Courtesy Call and Meeting with ENEE and SEPLAN Discussion on M/D with SANAA
9	2012/8/16	Thu	Discussion on Minutes of Discussions (M/D) with SANAA Signing M/D Report to JICA			Site Visit	Discussion on M/D with SANAA Signing M/D Report to JICA		Discussion on M/D with SANAA Signing M/D Report to JICA		Site survey, Preparation for Topo. Survey	Discussion on M/D with SANAA Signing M/D Report to JICA
10	2012/8/17	Fri	Tegucigalpa 12:55 - 18:35 Atlanta (DL552) Atlanta 21:54 - 23:37 Los Angels (DL2355)		Discussions with SANAA	Site Visit	Discussions with SANAA		Discussions with SANAA		Site survey, Preparation for Topo. Survey	Interpreter
11	2012/8/18	Sat	Los Angels 01:10 -		Site survey (Concepcion &Picacho)				Site survey		Site survey, Preparation for survey work	Interpreter
12	2012/8/19	Sun	- 04:55 Haneda (DL635)		Preparation of documents				Preparation of documents		Preparation of documents	Translating documents
13	2012/8/20	Mon			Discussions with SANAA Flow measurement (Picacho) Site survey		Discussions with ENEE Site survey		Discussions with ENEE Site survey		Flow measurement (Picacho) Supervision of survey works	Interpreter
14	2012/8/21	Tue			Discussions with SANAA Site survey		Discussions with SANNA Site survey Basic design study	15:45 Narita (DL296) - 15:05 Atlanta	Discussions with SANNA Environment & social survey		Discussions with SANAA Supervision of survey works	Interpreter
15	2012/8/22	Wed			Discussions with SANAA Flow measurement (Rindero pond)		Discussions with SANNA Site survey Basic design study	10:00 Atlanta (DL849) - 11:42 Tegucigalpa	Survey of Picacho water sources		Flow measurement (Rindero) Supervision of survey works	Interpreter
16	2012/8/23	Thu			Discussions with SANAA Flow measurement (Picacho)		Discussions with SANNA Site survey Basic design study	Site survey	Environment & social survey		Flow measurement (Picacho) Supervision of survey works	Interpreter
17	2012/8/24	Fri			Discussions with SANAA Flow measurement (Picacho)		Discussions with SANNA Site survey Basic design study	Market survey Material survey	Environment & social survey		Flow measurement (Picacho) Supervision of survey works	Interpreter
18	2012/8/25	Sat			Site survey			Market survey Material survey	Site survey		Supervision of survey works	Interpreter
19	2012/8/26	Sun			Preparation of documents						16:35 Tegucigalpa (TA700) - 17:53 Guatemala	Translating documents
20	2012/8/27	Mon			Discussion with SANAA Basic design study	Site survey Construction planning study	Discussion with ENEE E/M facility planning	Site Survey Market survey	Discussions with SANNA, Environment & social survey			Interpreter
21	2012/8/28	Tue			Water flow, pressure measurement (Picacho) Basic design study	Site survey Construction planning study	Water flow, pressure measurement (Picacho) E/M facility planning	Site Survey Market survey	Environment & social survey			Interpreter
22	2012/8/29	Wed			Water flow, pressure measurement (Picacho) Discussion with SERNA/AMDC	Construction planning study, Transportation route survey	Water flow, pressure measurement (Picacho) E/M facility planning	Market survey Material survey	Environment & social survey, Discussion with SERNA/AMDC	15:45 Narita (DL296) - 15:05 Atlanta		Interpreter
23	2012/8/30	Thu			Discussion with SANAA Basic design study	Construction planning study, Transportation route survey	Water flow, pressure measurement Discussion with SANAA E/M facility planning	Market survey Material survey	Discussions with SANNA, Environment & social survey	10:00 Atlanta (DL849) - 11:42 Tegucigalpa		Interpreter
24	2012/8/31	Fri			Site survey (Picacho upstream alternative site)							Interpreter
25	2012/9/1	Sat			Site survey (Picacho upstream alternative site)	12:55 Tegucigalpa (DL552) - 18:35 Atlanta	Site survey (Picacho upstream alternative site)		12:55 Tegucigalpa (DL552) - 18:35 Atlanta	Site survey (Picacho upstream alternative site)		Interpreter
26	2012/9/2	Sun			Preparation of documents	13:50 Atlanta (DL295) -	Site survey (Picacho upstream alternative site)		13:50 Atlanta (DL295) -	Preparation of documents	10:40 Guatemala (TA701) - 12:08 Tegucigalpa	Interpreter
27	2012/9/3	Mon			Discussions with SANNA Preparation of Site survey Report (alternative site)	- 16:30 Narita	Discussions with ENEE E/M facility palnning	Market survey Survey of construction conpany, labour cost	- 16:30 Narita	Discussions with SANNA Preparation of Site survey Report (alternative site)	Discussions with SANNA Supervision of survey work	Interpreter
28	2012/9/4	Tue			Discussions with SANNA Preparation of Site survey Report (alternative site)		Discussions with ENEE E/M facility palnning	Market survey Survey of construction conpany, labour cost		Discussions with SANNA Preparation of Site survey Report (alternative site)	Discussions with SANNA Supervision of survey work	Interpreter
29	2012/9/5	Wed			Discussions with SANNA Power generation palnning		Discussions with SANNA E/M facility palnning	Market survey Survey of construction conpany, labour cost		Civil Construction planning	Discussions with SANNA Supervision of survey work	Interpreter
30	2012/9/6	Thu			Discussions with SANNA Power generation palnning		Discussions with SANNA E/M facility palnning	Market survey Survey of construction conpany, labour cost		Civil Construction planning	Discussions with SANNA Supervision of survey work	Interpreter
31	2012/9/7	Fri			Site survey (distribution ponds)		Discussions with SANNA E/M facility palnning	Site survey (distribution ponds)		Civil Construction planning	Site survey (distribution ponds)	Interpreter
32	2012/9/8	Sat			Site survey (Concepcion)		E/M facility palnning	Market survey		Site survey (Concepcion)	Site survey (Concepcion)	Translating documents
33	2012/9/9	Sun			Preparation of documents		Preparation of documents			Preparation of documents		Translating documents
34	2012/9/10	Mon			Presentation to SANAA Progress Report toJICA		Presentation to SANAA Progress Report toJICA			Presentation to SANAA Progress Report toJICA		
35	2012/9/11	Tue			12:55 Tegucigalpa (DL552) - 18:35 Atlanta		12:55 Tegucigalpa (DL552) - 18:35 Atlanta	12:55 Tegucigalpa (DL552) - 18:35 Atlanta		Site survey Civil facility planning	Supervision of survey work Check of survey result	Interpreter
36	2012/9/12	Wed			8:10 Atlanta (DL563) - 10:25 Seattle 12:10 Seattle (DL183) -		8:10 Atlanta (DL563) - 10:25 Seattle 12:10 Seattle (DL183) -	13:50 Atlanta (DL295) -		Site survey Civil facility planning	Supervision of survey work Check of survey result	Interpreter
37	2012/9/13	Thu			- 15:35 Kansai		- 15:35 Kansai	- 16:30 Narita		Site survey Civil facility planning	Supervision of survey work Check of survey result	Interpreter
38	2012/9/14	Fri								Site survey Civil facility planning	Supervision of survey work Check of survey result	Interpreter
39	2012/9/15	Sat								Site survey Civil facility planning	Supervision of survey work Check of survey result	Translating documents
40	2012/9/16	Sun								Preparation of documents		Translating documents
41	2012/9/17	Mon								Hearing from SANAA Civil facility design	Check of survey result Hearing from SANAA	Interpreter
42	2012/9/18	Tue								Hearing from SANAA Civil facility design	Check of survey result Hearing from SANAA	Interpreter
43	2012/9/19	Wed								12:55 Tegucigalpa (DL552) - 18:35 Atlanta	16:35 Tegucigalpa (TA700) - 17:53 Guatemala	12:55 Tegucigalpa (DL552) - 18:35 Atlanta
44	2012/9/20	Thu								8:10 Atlanta (DL563) - 10:25 Seattle 12:10 Seattle (DL183) -		8:10 Atlanta (DL563) - 10:25 Seattle 12:10 Seattle (DL183) -
45	2012/9/21	Fri								- 15:35 Kansai		- 15:35 Kansai

2nd Site Survey

No	Date	Day	JICA		Consultant			
			Leader	Project Coordinator	Chief Consultant /Electric Power, Operation and Maintenance Management Planning	Construction Planning	Electro-Mechanical Equipment and Protection and Control system Planning	Interpreter
			Mr.Shigeru MAEDA/ JICA	Ms.Chiyoko MIYATA/ JICA	Mr.Yuichi SANO/ NEWJEC Inc.	Mr. Kazuhiro ARITA/ JAPAN TECHNO Co., Ltd.	Mr. Shigeru TSUNEKI/ NEWJEC Inc.	Mr. Akio OKAMURA/ TECHNO STAFF Inc.
1	2012/12/12	Wed			Depart from Japan			Depart from Japan
2	2012/12/13	Thu			Arrive at Tegucigalpa SANAA Meeting			Arrive at Tegucigalpa SANAA Meeting
3	2012/12/14	Fri			Report Preparation			Translating documents
4	2012/12/15	Sat			Report Preparation	Depart from Japan		Translating documents
5	2012/12/16	Sun			Internal meeting	Arrive at Tegucigalpa Internal meeting		Internal meeting
6	2012/12/17	Mon	Haneda 00:30 - 17:40 Los Angels (at Dec.16) (DL636) Los Angels 22:45 - 05:58 Atlanta (DL1354) Atlanta09:55 - 12:45 Tegucigalpa (DL849)		Explanation on Draft Final Report (DFR) with SANAA, Outline Design			
			Meeting with JICA Honduras office Meeting with JICA Consultant Team			Discussion on grid connection etc. with ENEE		
7	2012/12/18	Tue	Draft Final Report (DFR) presentation (Attendant) SANAA、ENEE、Tegucigalpa Municipality、SERNA、SEPLAN Discussion on DFR (including Q & A), Confirmation on the work demercation between the Japanese side and Honduras sides (Attendant) SANAA					
8	2012/12/19	Wed	Discussion on draft Minutes of Discussion (M/D) with SANAA					
			SANAA Finalization of M/D document		Depart from Tegucigalpa	SANAA Finalization of M/D document		
9	2012/12/20	Thu	M/D sign at SANAA Report to JICA Honduras Office Site Visit with Embassy of Japan		Arrive in the USA	M/D sign at SANAA Report to JICA Honduras Office Site Visit with Embassy of Japan		
10	2012/12/21	Fri	Tegucigalpa 06:40 - 07:45 San Salvador (TA480) San Salvador 08:57 - 12:27 Los Angels (TA522) Los Angels 16:55 -		Arrive in Japan	Report Preparation		
11	2012/12/22	Sat	- 22:30 Haneda (DL637)			Depart from Tegucigalpa		
12	2012/12/23	Sun				Arrive in the USA		
13	2012/12/24	Mon				Arrive in Japan		

3. List of Parties Concerned in the Recipient Country

List of Parties Concerned in Recipient Country

National Autonomous Service of Aqueducts and Sewerage (Servicio Autónomo Nacional de Acueductos y Alcantarillados, SANAA)		
Danilo Alvarado Rodriguez	Gerencia General, Gerente	Manager / General management
Carlos Humberto Hernandez Rodas	Gerencia Metropolitana, Gerente	Manager / Metropolitan Management
Walter R. Pavón. V	Gerencia Inversion, Gerente	Manager / Investment Management
Marcio Rodriguez A.	Division de Planeación, Gerente	Manager / Planning Division
Pedro E. Ortiz	Gerencia, Asesor Técnico	Technical Advisor/Management
Melvin A. Guevara	Ingeniero de Proyecto	Project Engineer
German Leonel Andino	Division de Planeación, Coordinador	Coordinator / Planning Division
Tomas Romero Artica	Operación D M, Jefe de Departamento	Chief of Department / Operation Department
Roberto Daniel Medrano	Sub-Sistema Concepción, Jefe de Sub-Sistema	Chief of Sub-System / Concepcion Sub-System
Oscar Enrique Salgado	Sub-Sistema Concepción, Encargado de Presa	In charge of dam / Concepcion Sub-System
Roger Omar Avilez	Sub-Sistema Picacho, Jefe	Chief of Sub- System / Picacho Sub-System
Edmond Gerardo Madrid	Operaciones, Asistente	Assistant / Operation
Rosbel Rene Rodriguez Nuñez	Manejo de Cuencas Hidrograficas, Jefe de Unidad de Evaluacion y Monitoreo Ambiental	Chief of Evaluation and Environmental Monitoring Unit / Hydrographic Basin Management
Carlos Tosta	Cuencas, Asistente Jefatura	Assistant Manager / Basin
Francisco Guitarro	Division de planeacion, Asistente	Assistant / Planning Division
National Electricity Power Company (Empresa Nacional de Energía Eléctrica, ENEE)		
Francisco Ramon Larios Z.	Desarrollo Sostenible, Coordiandor de Proyectos Hidro-electricos	Coordinator of Hydro-Electric Projects / Sustainable Development
Glenda Castillo	Desarrollo Sostenible, Jefe de Departamento	Chief of Department / Sustainable Development
Percy Buck	Gerencia, Asesor Tecnico	Technical Advisor / Management
Jorge Moraza	Energia removable, Jefe Depto	Chief of Department / Renewable Energy
Elmer Bustith	Distribucion, Jefe Division	Chief of Division / Distribution
Luis Borjas	Distribucion, Jefe Unidad Operacion	Chief of Operation Unit / Distribution
Roque Lopez	UREE, Jefe Depto UREE	Chief of UREE / UREE Department
Lucas Raveos	Transmision, Jefe Transmision	Chief of Department / Transmission

Municipal Office of Central District (Alcaldía Municipal del District Central, AMDC)		
Jose Oswaldo Guillen	Gerencia General, Gerente	Manager / General Management
Jose Teruel	UGASAM, Asistente Direccion	Assistant Director / UGASAM
Ministry of Natural Resource and Environment (Secretaría de Recursos Naturales y Ambiente, SERNA)		
Julio E. Eguiguren	DECA (Divisón de Evaluación y Control Ambiental), Director	Director of Evaluation and Environmental Control Division
Technical Ministry of Planning and International Cooperation (Secretaría Técnica de Planificación y Cooperación Externa, SEPLAN)		
José Antonio Silva	Dirección de Planeación, Especialista en Planificación	Planning Specialist / Plannning Department
Ana Galeano	Direccion General de Cooperación Externa, Especialista en Cooperación	Cooperation Specialist / Exterior Cooperation Department
Clarissa Lanza	Despacho	Management
JICA Honduras Office		
Akihiko YAMADA	Director	Director
Hiroshi NISHIKI	Vice Director	Vice Director
Sandra Rivera	Oficial de Programa de Cambio Climático	Climate Change Program officer

4. Minutes of Discussions (M/D)

Minutes of Discussions
on
the Preparatory Survey for the Project of Micro-Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras

In response to the request from the Government of the Republic of Honduras (hereinafter referred to as "GOH"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan (hereinafter referred to as "GOJ"), decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the Project of Micro-Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa (hereinafter referred to as "the Project").

JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") to Honduras, headed by Mr. Shigeru MAEDA, Technical Senior Advisor to the Director General, Department of Industrial Development and Public Policy, JICA. The Team is scheduled to stay in Honduras from August 9 to September 21, 2012.

The Team held discussions with the officials of concerned authorities in Honduras (hereinafter referred to as "the Honduras side"), and conducted a series of field survey. In the course of the discussions, both the Honduras side and the Team (hereinafter referred to as "Both sides") have confirmed the main items described in the sheets attached hereto.

Tegucigalpa, August 16th, 2012

前田 秀

Shigeru MAEDA

Leader
Preparatory Survey Team
Japan International Cooperation Agency

Danilo Alvarado Rodríguez

Director General
Servicio Autónomo Nacional de Acueductos y Alcantarillados

Witness:

María Felix Amador

Especialista en Cooperación Externa
Secretaria Técnica de Planificación y Cooperación Externa

ATTACHMENT

1. Objective of the Project

The objective of the Project is to construct small-scale hydropower plants in Concepcion and Picacho Water Treatment Stations for contributing to improvement of financial business operation of Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA).

2. Locations of Projects

The project sites are located in Concepcion and Picacho in Tegucigalpa as shown in Annex-1.

3. Responsible and Implementing Organizations

SANAA is the responsible organization and the implementing organization of the Project.

The Organization Structure of SANAA is shown in Annex-2.

4. Components Confirmed by Both Sides

Both sides confirmed that components of the Project are as follows.

(1) Construction of small-scale hydropower plants and associated works on Concepcion and Picacho Water Treatment Stations.
(2) Power dispatch to the existing grid and optimization in power generation.
(3) Training on O&M and technology involved in newly introduced generation facility

JICA will assess the appropriateness of the components for Japan's Grant Aid and report the findings to GOJ.

5. Project Implementation Structure and concerned organizations

(1) Empresa Nacional de Energía Eléctrica (ENEE)

As ENEE is the National Electric Power Corporation, which will be connected to the small-scale power plant built in the Project, both sides agreed that necessary infonmation exchange with SANAA and their technical support is important for the success of the Project.

(2)Tegucigalpa Municipality

Currently, the Project implementing organization is regarded as SANAA. However, considering that a part of SANAA's business will be transferred to Tegucigalpa Municipality, both sides agreed to involve the Municipality into the Project as a major concerned organization from the survey stage.

6. Utilization of generated power from the Project

The generated energy from small-scale hydropower plants will obtain the following benefits.

(1) After consumption at Conception and Picacho Water Treatment Stations including relevant facilities, the surplus electricity will be sold to ENEE at the price of Renewable Energy Law.
(2) All generated electricity from small-scale hydropower plants will be sold in the form of Energy Credit which alternate expenditure for pumping energy at all treatment plants.

Both sides agreed that SANAA will select one of above mentioned options and inform the survey

team before the survey team leaves Tegucigalpa in September 2012.

MFAE

7. Optimal Design

The survey team explained and the Honduras side agreed that the optimum design scheme shall be selected among the alternative schemes considering economical, reliable, sustainable, environmental, construction easiness and operation and maintenance easiness aspects through the survey.

8. Consideration of safety design

Both sides agreed that the survey shall be made considering the following safety aspects.

(1) At the Picacho site, purified water is to be utilized for power generation, so the parts of plant shall be selected and assembled with enough measures to protect purified water from oil leak, rusting, erosion etc., and the adequate maintenance shall be carried out.
(2) Existing water pipes shall not be damaged by water hammer pressures due to water turbine.
(3) Construction methods shall be examined to minimize adverse effects on the surrounding areas.
(4) In case of accident and repair of the turbine, the primary function of the existing infrastructure shall be guaranteed.

9. Japan's Grant Aid Scheme

(1) JICA confirmed that the Honduras side understood Japan's Grant Aid Scheme explained by the Team as described in Annex-3 and 4.
(2) The Honduras side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project as prerequisites for the Japan's Grant Aid to be implemented.

10. Environmental and Social Considerations

(1) The Honduras side agreed to comply with the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "JICA Guidelines") as well as laws and regulations in Honduras, and was requested to prepare Environmental Checklist and Monitoring Form which are designated by JICA Guidelines for an outline design.
(2) The Honduras side agreed to make necessary arrangements with concerned governmental organizations in order to secure funding for and execution of the above environmental matters in a schedule as required for smooth execution of the Project.
(3) A part of area in Picacho site may be located in the national park area. Both sides agreed that the status of the area should be firstly clarified then the survey team will confirm necessary procedures for project implementation in that area in cooperation with SANAA.

11. Schedule of the Survey

The team will continue with the Field Survey in Honduras until 21st September, 2012 and report the result to GOJ. Based on the results of the Survey, JCA will dispatch the team to Honduras to explain the report of the Preparatory Survey in December, 2012.

12. Other Relevant Issues

(1) Status of the Survey

The Team explained that the purpose of the Survey is to collect information and data necessary

for the outline design and cost estimates of the Project components which are confirmed through the Survey and the analysis in Japan.

(2) Coordination of SANAA and other relevant organizations
Both sides confirmed that the Honduras side will take proper action to coordinate SANAA and other relevant organizations.

(3) Assignment of counterpart personnel
Both sides confirmed the need of assignment of counterpart personnel from the Honduras side.

(4)Major equipment installed in the Project
The JICA team explained that the Project will be conducted under the Japanese Grant Aid Program aiming at promoting "Green Growth", which GOJ puts stress on, by introducing small scale hydropower plants with elaborated technologies of Japan.

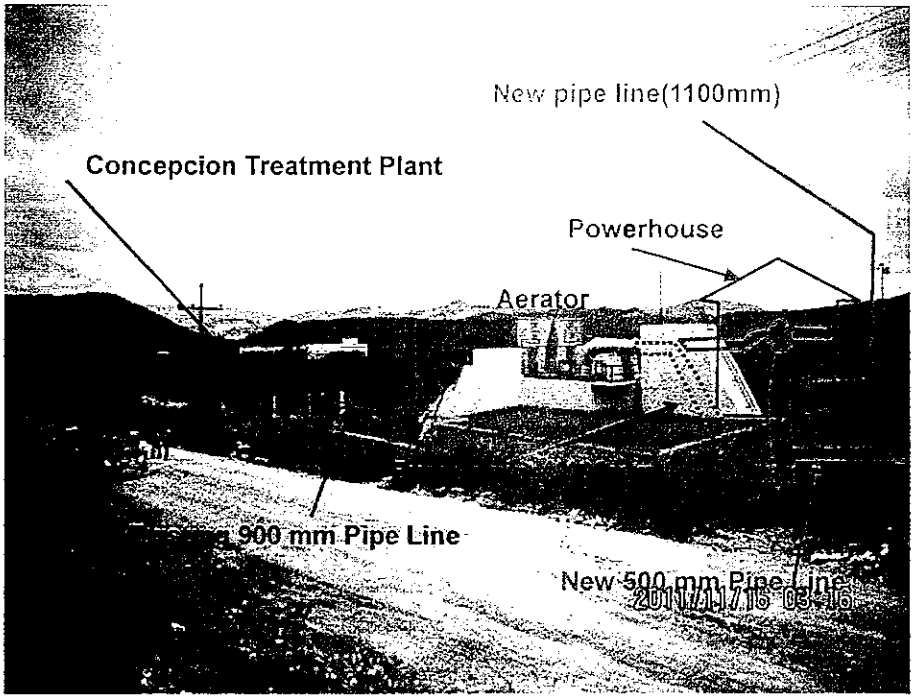
(End)

Annex-1	Project Sites
Annex-2	Organization Chart of SANAA
Annex-3	Japan's Grant Aid
Annex-4	Flow Chart of Japan's Grant Aid Procedures
Annex-5	Major Undertakings to be taken by Each Government

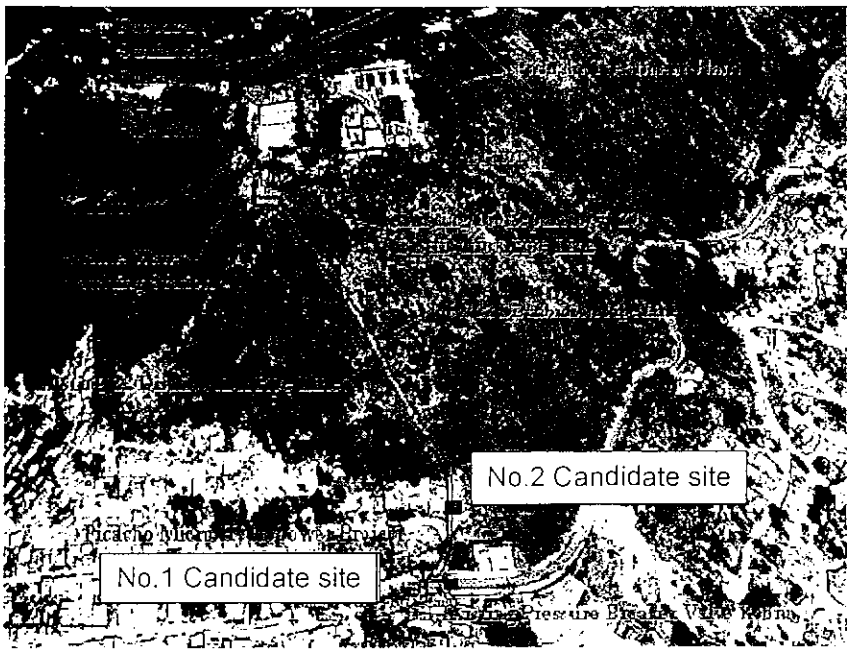
MFAE

Annex 1

Project Sites



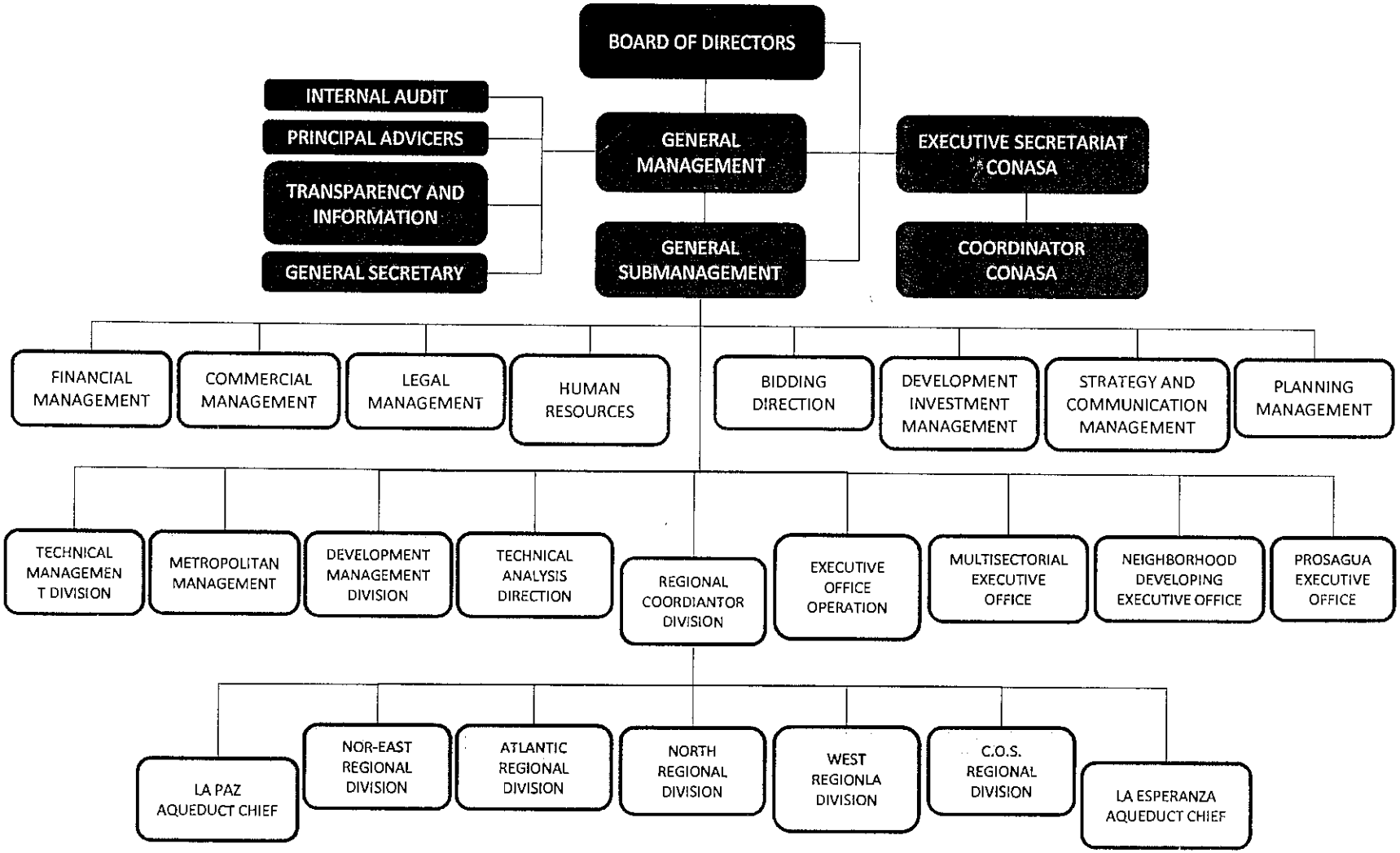
Concepcion Site



Picacho Site

Annex 2

ORGANIZATION CHART OF SANAA
SERVICIO AUTONOMO NACIONAL DE ACUEDUCTOS Y ALCANTARILLADOS



Annex-3

JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

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1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures:

・Preparatory Survey
  - The Survey conducted by JICA
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・Implementation
  -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
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(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

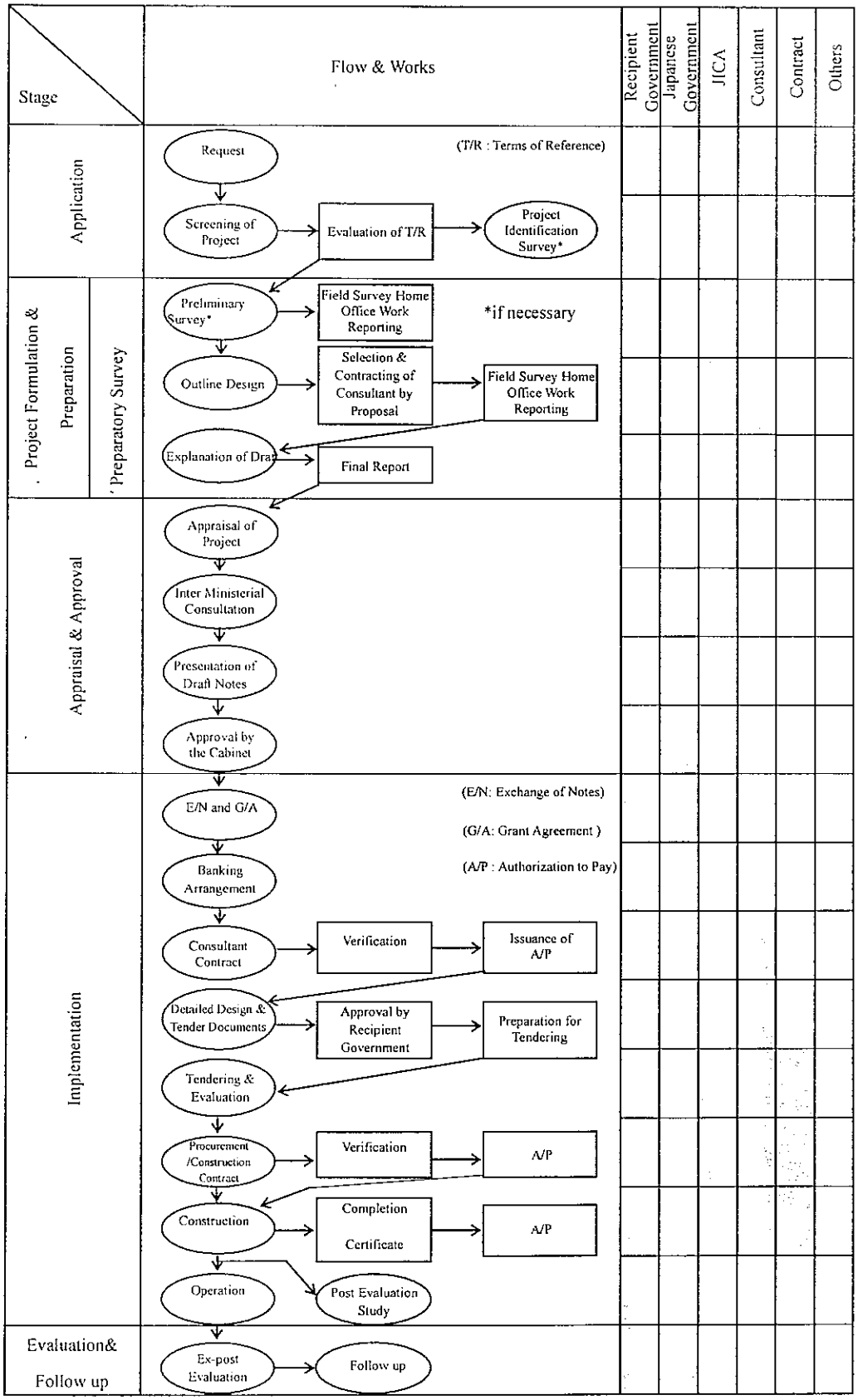
(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

(End)

Annex-4

Flow Chart of Japan's Grant Aid Procedures



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Annex-5

Major undertakings to be taken by each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure [a lot] /[lots] of land necessary for the implementation of the Project and to clear the [site]/[sites]:		●
2	To construct the following facilities		
	1) The building	●	
	2) The gates and fences in and around the site		●
	3) The parking lot	●	
	4) The road within the site	●	
	5) The road outside the site		●
3	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the [site]/[sites]		
	1)Electricity		
	a. The distributing power line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the site)		●
	b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
4	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services [be exempted] / [be borne by the Authority without using the Grant]		●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To ensure that [the Facilities and the products]/[the Facilities]/ [the products] be maintained and used properly and effectively for the implementation of the Project		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
10	To give due environmental and social consideration in the implementation of the Project.		●

*1 B/A : Banking Arrangement, A/P : Authorization to pay) *2 If the environmental screening category is C, No. 10 is unnecessary

Minutes of Discussions
on
the Preparatory Survey for the Project of Micro-Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa in the Republic of Honduras
(Explanation on Draft Final Report)

In response to the request from the Government of the Republic of Honduras (hereinafter referred to as "GOH"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan (hereinafter referred to as "GOJ"), decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the Project of Micro-Hydroelectric Power Generation in Metropolitan Area of Tegucigalpa (hereinafter referred to as "the Project").

From August to September 2012, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") to Honduras, and through discussions, field surveys and technical examination of the results of the surveys in Japan, JICA prepared a Draft Final Report of the Outline Design.

In order to explain and to consult with the concerned officials of GOH (hereinafter referred to as "the Honduras side") on the components of the Draft Final Report, JICA dispatched the Team again to Honduras, which is headed by Mr. Shigeru MAEDA, Executive Technical Advisor to the Director General, Department of Industrial Development and Public Policy, JICA, from December 13th to 22nd, 2012.

And as a result of discussion, the Honduras side and the Team (hereinafter referred to as "both sides") confirmed the main items described in the sheets attached hereto.

Tegucigalpa, December 20th, 2012

Shigeru MAEDA

Leader
Preparatory Survey Team
Japan International Cooperation Agency

Danilo Alvarado Rodríguez

Director General
Servicio Autónomo Nacional de Acueductos y Alcantarillados

Witness:

Christa Castro

Asistente del Vice Alcalde
Alcaldía Municipal del Distrito Central

Witness:

Karoline Pacheco Suazo

Sub Secretaria de Estado de Planificación del Desarrollo
Secretaria Técnica de Planificación y Cooperación Exterma

ATTACHMENT

1. Components of the Draft Final Report

The Honduras side agreed and accepted in principle the components of the Draft Final Report including Draft Technical Specifications explained by the Team.

2. Components of the Project confirmed by both sides

The components of this project are as follows;

(1) Construction of a Small-scale Hydropower Plant (hereinafter referred to as "SHP") at the Concepcion Water Treatment Station. (See Annex-1)

(2) Construction of a SHP at the Picacho Water Treatment Station (See Annex-1)

(3) Soft Component (Technical Assistance)

The Team explained that the following ideas of soft component were under consideration for the smooth start of utilization of the SHPs.

1) Technical guidance on Operation and Maintenance (hereinafter referred to as "O&M") of SHPs in consideration with water distribution plan to general users and interconnection to the electricity grid
2) Technical guidance on medium and long term O&M planning done by Servicio Autónomo Nacional de Acueductos y Alcantarillados (hereinafter referred to as "SANAA") from the technical and financial aspects
3) Technical guidance on total monitoring of SHP operation

However, the soft component provided by the Japanese Consultants contracted by the Honduras side, and initial operation instructions done by hydro turbine or generator manufactures, should not be duplicated. Accordingly, ideas of soft component in the Draft Final Report could be partially modified by the result of more careful examination of soft component and manufacturers' instructions.

3. Responsible and Implementing Organizations, and concerned organizations

(1) Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA)

SANAA is the responsible organization and the implementing organization of the Project. The Organization Structure of SANAA is shown in Annex-2.

(2) Empresa Nacional de Energía Eléctrica (ENEE)

As ENEE is the National Electric Power Corporation, which will be connected to the SHPs built in the Project, both sides agreed and requested that necessary information should be exchanged with SANAA and technical support to SANAA should be provided for the success of the Project during both the construction stage and the plant operation stage.

(3) Tegucigalpa Municipality (Alcaldía Municipal del Distrito Central: AMDC)

Currently, the Project implementing organization is regarded as SANAA. However, considering that a part of SANAA's business will be transferred to Tegucigalpa Municipality, both sides agreed to involve the Municipality into the Project as a major concerned organization during both the construction stage and the plant operation stage.

4. Confirmation of progress made from the previous M/D

(1) Project site and capacity of SHP

Both sides confirmed that project sites were Concepcion and Picacho Water Treatment

Stations. The Team explained that the design capacity of SHPs to be constructed in Concepcion site would be 250kW and in Picacho site 180kW based on the result of outline design and cost estimation.

(2)Application of the Related Laws and Regulations

Based on the previous Minutes of Discussions (hereinafter referred to as "M/D"), the Team reconfirmed that the Honduras side agreed to obtain the permission to construct SHP and to have it connected to the national grid. It was also confirmed by both sides that SANAA should obtain the permission of ENEE for the operation of SHP to be connected to the national grid by the commencement of the construction work of SHPs.

5. Project Cost

The Honduras side agreed that the Project cost should not exceed the upper limit of amount agreed on the Exchange of Note (E/N) and the Grant Agreement (G/A). Both sides confirmed that the Project cost contains procurement cost of equipment, the cost for transportation up to the Project Site, installation cost, and the consultant fee that includes the cost for soft component for the technical assistance of operation and maintenance of SHP and related equipment as a whole.

The Honduras side understood that the Project Cost Estimation attached as Annex-3 is not final and is subject to change by the result of examination through revision of the Outline Design Study.

6. Undertakings required by the Honduras side

The Honduras side agreed that the Honduras side should abide by the following undertakings, though these were included in major undertakings described in Annex 7.

(1)Allocation of land/space for installation of the relevant equipment and materials for SHPs

As the owners of the land where a part of the relevant equipment and materials for SHPs will be installed are private personnel, both sides confirmed SANAA would implement necessary land acquisition through appropriate procedures according to domestic laws and the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "JICA Guidelines") before the Project starts.

(2)Relocation of existing distribution water pipeline

There is existing distribution water pipeline, which cross the space for the newly constructed powerhouse at Picaho site. Honduras side agreed that they would relocate this pipeline before the Project starts.

(3) Ownership and Responsibilities for Operation and Maintenance

The Honduras side reconfirmed that SANAA was primarily the owner of the SHPs constructed by the Project, and SANAA was primarily responsible for O&M of the SHPs.

The Honduras side confirmed the estimated cost for O&M described in Annex 4 and agreed that SANAA would secure necessary budget and assign necessary personnel for the O&M of the SHPs under the Project.

However, the Honduras side confirmed that SANAA and/or Tegucigalpa Municipality should be responsible for allocation of necessary budget and O&M personnel even after a part of business of SANAA shall be transferred to Tegucigalpa Municipality following the relevant laws.

7. Japan's Grant Aid Scheme

(1) The Team confirmed that the Honduras side understood Japan's Grant Aid Scheme explained by the Team as described in Annex-5 and 6.

(2) The Honduras side will take the necessary measures, as described in Annex-7, for smooth implementation of the Project as prerequisites for the Japan's Grant Aid to be implemented.

8. Confidentiality of the Project

(1) Detailed specifications of the Facilities and Equipment

Both sides confirmed that all the information related to the Project should not be released to any outside parties before conclusion of all the contract(s) for the Project because they are confidential document that contains information related to the tender.

Such information includes the followings:

a) detailed drawings, specifications of the facilities and equipment, and other technical information of the facilities and equipment;

b) the Draft Final Report;

c) the Final Report

(2) Confidentiality of the Cost estimation

The Team explained the estimated cost of the project as described in Annex 3. The Honduras side agreed that the estimated cost of the Project should never duplicated or disclosed to any outside parties (i.e. outside of JICA and the Honduras side) before tender for the project.

9. Environmental and Social Considerations

(1) The Honduras side agreed to comply with the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "JICA Guidelines") as well as laws and regulations in Honduras. In particular, the Honduras side confirmed that land necessary for the Project also should be secured complying with JICA Guidelines and domestic laws and regulations in Honduras.

(2) Both sides confirmed that SANAA would make necessary arrangements with concerned governmental organizations in order to secure funding for and execution of the environmental and social matters in a schedule as required for smooth execution of the Project. Such information on environmental and social consideration including major impacts and relevant mitigation measures will be summarized and finalized in the Environmental Checklist in the Preparatory Survey Final Report. SANAA confirmed that they would inform JICA about any major changes which may affect environmental and social considerations made for the Project by revising the Checklist in a timely manner.

(3) Both sides confirmed that environmental monitoring would be conducted by SANAA in accordance with the Environmental Monitoring Plan described in the Preparatory Survey Final Report.

(4) SANAA confirmed that it would take stipulated procedures for information disclosure in accordance with "Ley general de medio ambient" and "Sistema National de Evaluacion de Impacto Ambiental". In addition, the Team requested SANAA to disclose the monitoring results to local project stakeholders, and SANAA agreed to disclose monitoring results on their website or in their field offices.

SANAA agreed that JICA would disclose provided monitoring results in the monitoring form on its website.

(5) Both sides confirmed that this project was expected to contribute to mitigation of climate change.

10. Schedule of the Survey

JICA will complete the final report in accordance with the confirmed items and comments from the Honduras side and send it to SANAA by the end of April 2013.

11. Other Relevant Issues

(1) Coordination of SANAA and other relevant organizations

Both sides confirmed that SANAA will take proper action to coordinate SANAA and other relevant organizations.

(2) Assignment of counterpart personnel

Both sides confirmed the need of assignment of counterpart personnel from the Honduras side.

(3)Customs and Tax Exemption

Based on the previous M/D, the Honduras side agreed that Honduras side should be responsible for the exemption of all customs, tax, levies and duties incurred in Honduras for implementation of the project.

(4) "Green Growth" policy and Major equipment installed in the Project

The Honduras side recognized, as the Embassy of Japan explained, that the Project will be formulated and conducted in accordance with the "Green Growth" policy of the Government of Japan, which emphasizes on utilizing the major equipment such as hydro turbines made by Japan's small and medium enterprises.

(5) SANAA's Request

SANAA strongly requested that the Project should include soft component required enough for SANAA's smooth start of operation of Small Hydropower Generation because it was the first experience for them to work on electric power generation. As well as soft component, SANAA refereed to the necessity of spare parts provided by the Project and they requested the Project cost covers primary spare parts as much as possible. The team explained to SANAA that JICA also understood the necessity of soft component and spare parts, but items of soft component and spare parts covered by the Project should be limited due to budget constraints. SANAA understood it.

(End)

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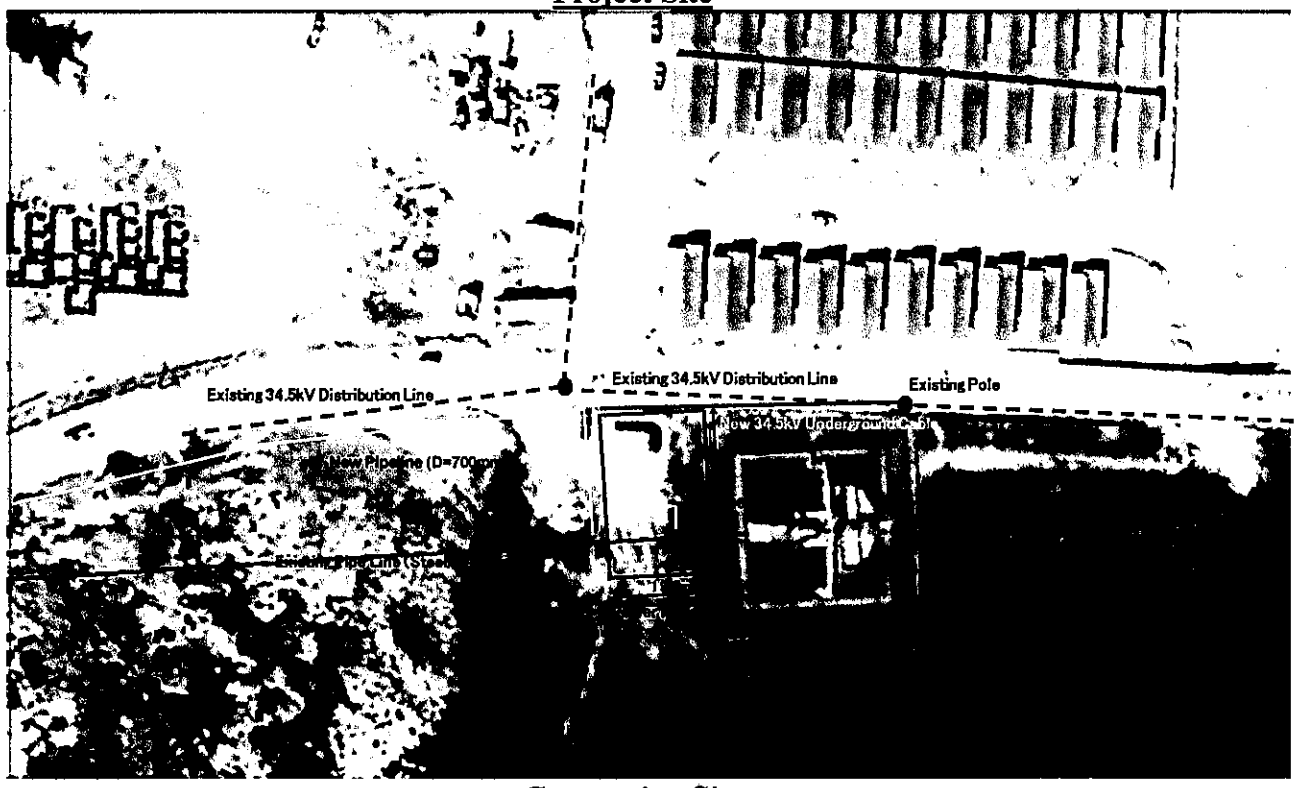
Annex 1

Project Site



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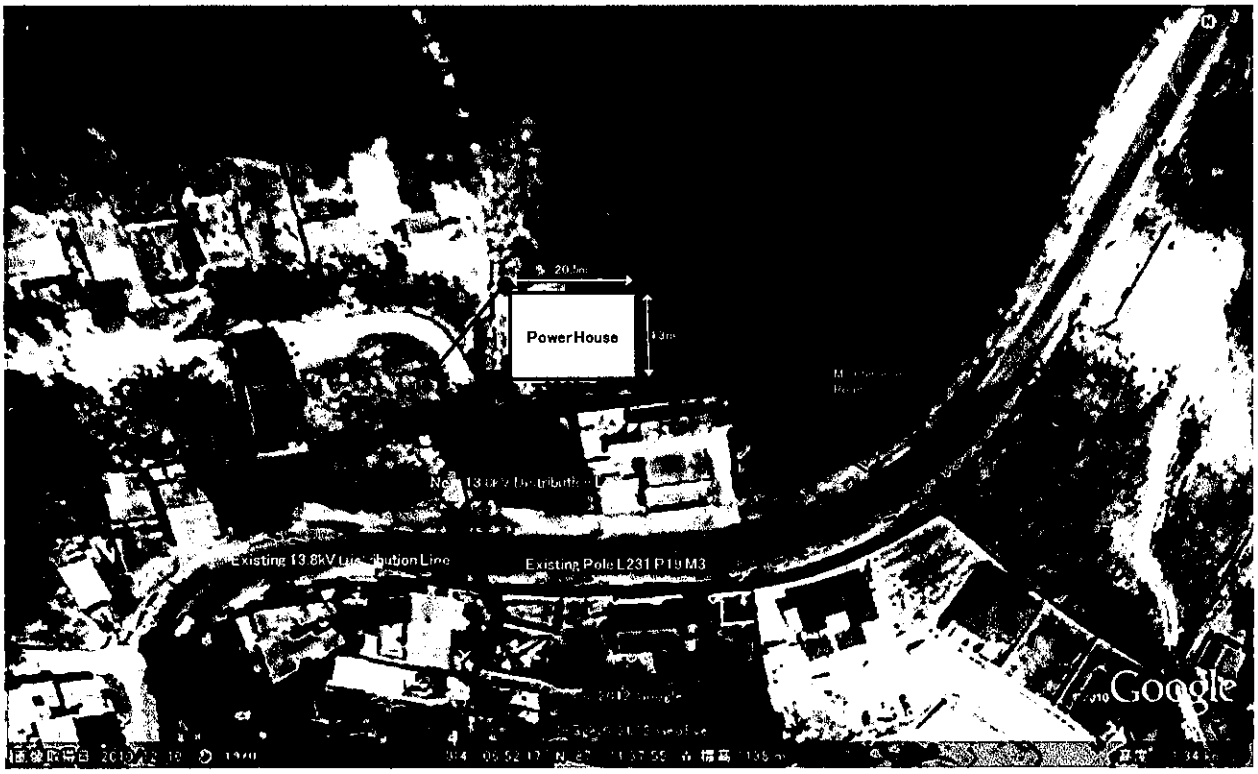

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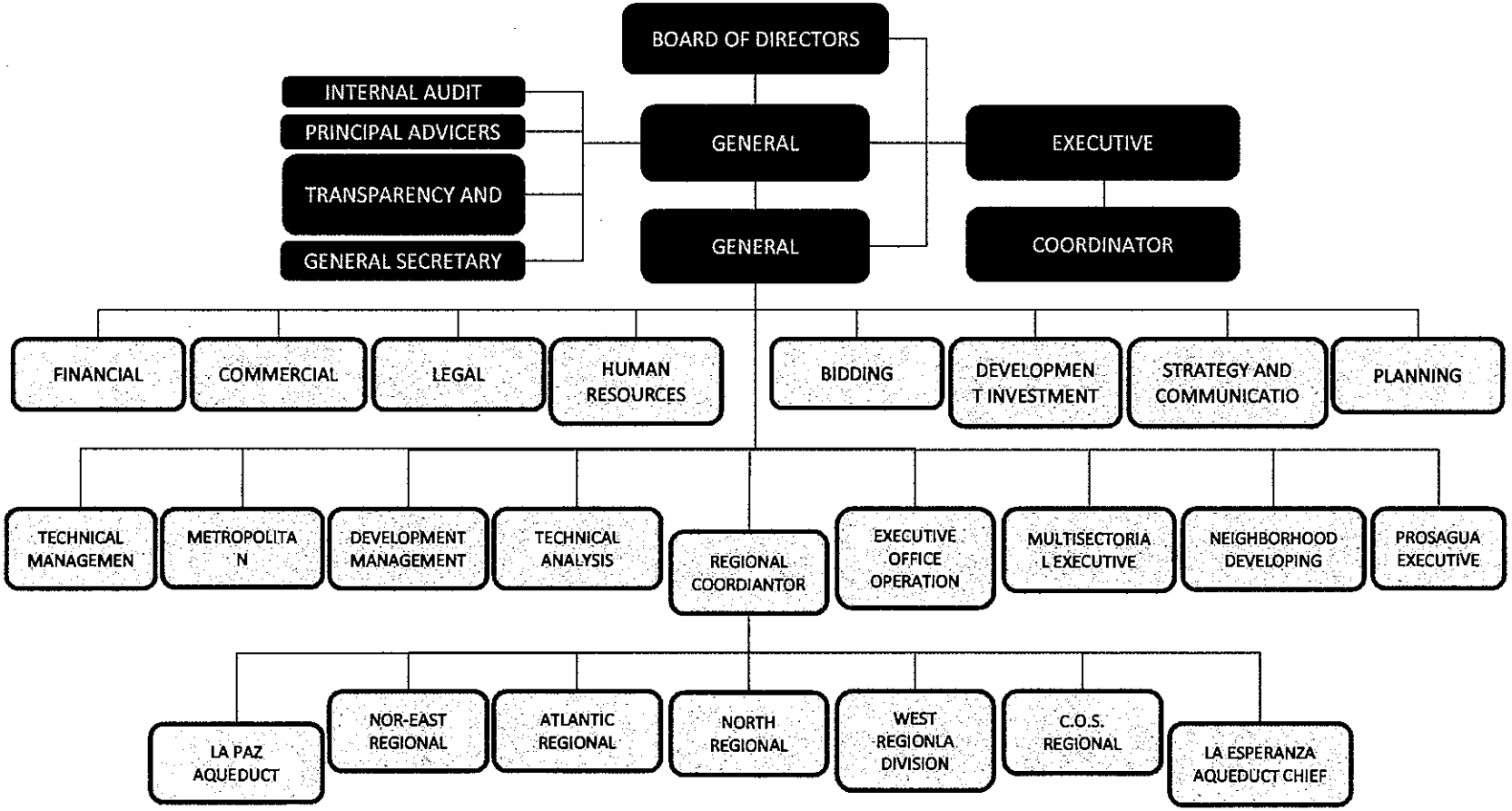

Annex 3

Project Cost Estimation
(Confidential)

(2) Cost of Honduras side

Project costs covered by the Honduras side is estimated as follows

Table 3-2 Project cost covered by Honduras side

Item	Lps.	a million Yen	Remarks
Acquisition of Lands			To be identified
Diversion of existing pipelines at proposed location of the power house in Picacho construction site	160,000 Lps.	0.7	Pipe Diameter 150mm、Steel Pipe 48m length
Cost of banking services, B/A and A/P	240,000 Lps.	1.0	0.1% of the Total Project Cost
Total			

Annex 4

Estimated Cost for O&M

Since this Project is implemented within the framework of the grant assistant, the initial cost such as the construction, procurement and installation costs including the site test cost is granted, however, it is necessary to cover the necessary expenses related personnel expenses, maintenance and management in order to operate a sustainable hydroelectric power generation business. These expenses, for increased burden does not occurred due to reduction of SANAA's electricity consumed price by selling the electric energy to be generated by the hydroelectric power plants.

Table 4-1 Maintenance Cost Items

The main expenditure items
1) Labor costs (power plant operating personnel, maintenance personnel)
2) Cost of purchasing spare parts
3) Other direct costs (such as office supplies)
4) Overhaul costs etc.

(1) Assumed Labor Cost

Four (4) operators for each hydroelectric power plant and two (2) maintenance crews, totally ten (10) personnel would be assigned. Expected labor cost is shown as below.

Table 4-2 Labor Cost of Operation and Maintenance

	Name	Number of staff	Salary	Remarks
1)	Operators	4 personnel × 2 Sites = 8 personnel	Lp.15, 000 / month × 8 personnel = Lp.120, 000	Salary of newly hired operator is Lp12,000/month. Salary of experienced hired operator is Lp15,000 - 18,000/month
2)	Maintenance Crews	2 personnel	Lp.20, 000 / month × 2 personnel = Lp.40, 000	Salary of newly hired engineer (ENEE) is Lp20,000 – Lp22, 000/month. Salary of experienced hired engineer (ENEE) is Lp25,000 - 28,000/month.
			Lp.160,000/month	

(2) Purchase Cost of Spare Parts

The table below shows the spare parts to be delivered in this Project. Of these, the replacement which may become necessary on a regular basis is a kind of valve seals and turbine shaft water seal packing. This cost is estimated Lps.24,000/year (about ¥100,000/year). If spares are used in the repairing work, it is necessary to purchase and keep them for future maintenance.

Table 4-3 List of Spare Parts

	Name	Quantity	Remarks
Concepcion Hydroelectric Power Plant			
1. Turbine	Bearings		**to be decided**
	Shaft water seal packing	1 lot	Replacement is necessary
	Packing	1 lot	Replacement is necessary
2. Generator	Bearings		**to be decided**
3. Control and Switchgear	Protection relay	1 set	
	Auxiliary relay	1 set	
Picacho Hydroelectric power plant			
1. Turbine	Bearings		**to be decided**
	Shaft water seal packing	1 lot	Replacement is necessary
	Packing	1 lot	Replacement is necessary
2. Generator	Bearings		**to be decided**
3. Control and Switchgear	Protection relay	1 set	
	Auxiliary relay	1 set	

(3) Other Direct Costs (Consumables)

Consumables such as printer cartridges of the printers for the control system, grease for the generator and office supplies are estimated as Lps.12,000/year (about ¥50,000/year).

(4) Overhaul Costs, etc.

The overhaul of the turbine and the generator in every 10 years would be implemented by the manufacturer's engineers. The replacement of the turbine water seal packing and the valve seals is assumed in the overhaul.

The overhaul cost is Lps.718,000/overhaul (about ¥3,000,000/overhaul) including costs of dispatching the manufacturer's engineer and spare parts such as the turbine water seal packing and valve seals.

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(3) Result of the Survey

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3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

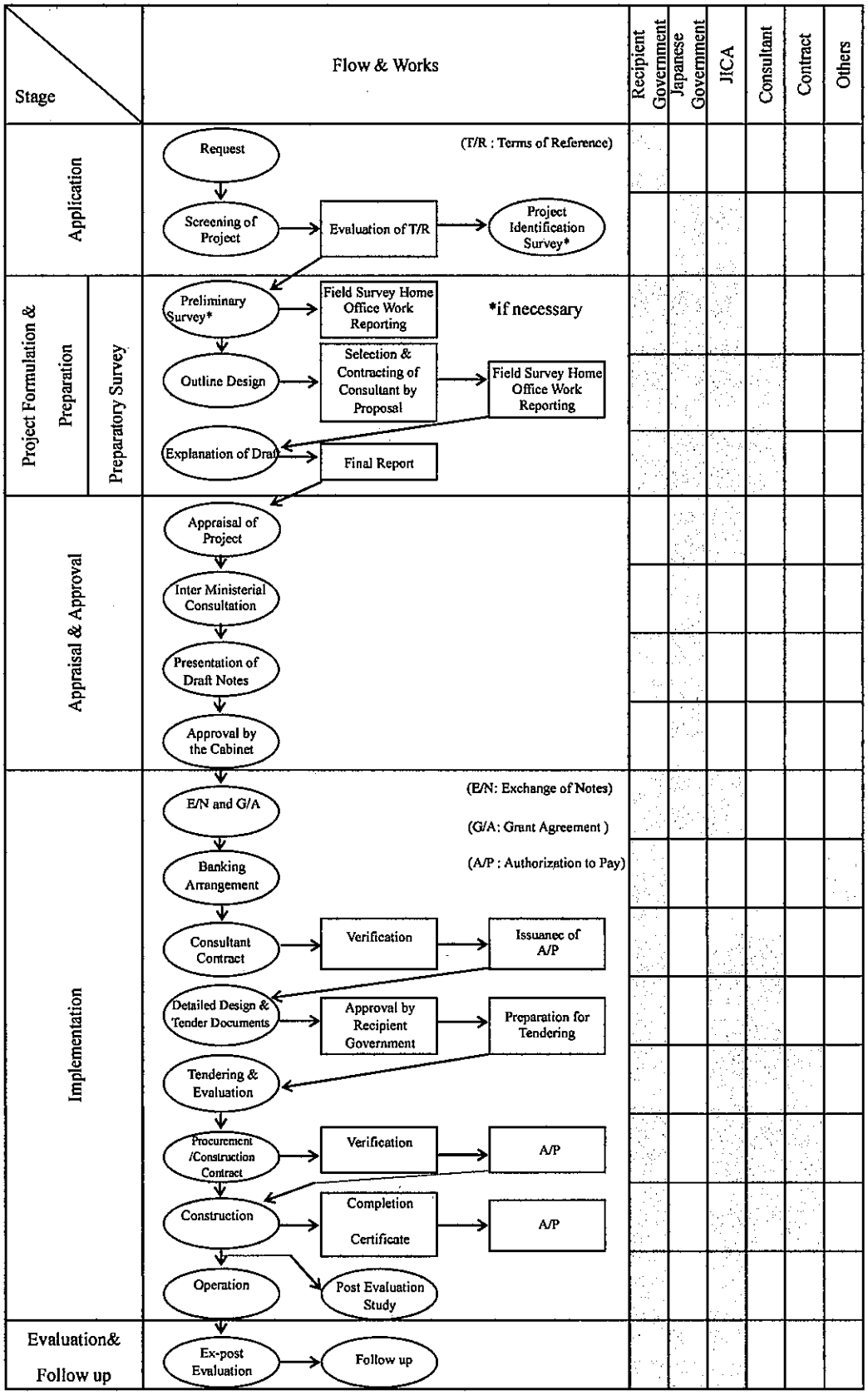
(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

(End)

Annex-6

Flow Chart of Japan's Grant Aid Procedures



Annex-7

Major undertakings to be taken by each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure [a lot] /[lots] of land necessary for the implementation of the Project and to clear the [site]/[sites];		●
2	To construct the following facilities		
	1) The building	●	
	2) The gates and fences in and around the site		●
	3) The parking lot	●	
	4) The road within the site	●	
	5) The road outside the site		●
3	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the [site]/[sites]		
	1)Electricity		
	a. The distributing power line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the site)		●
	b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
4	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services [be exempted] / [be borne by the Authority without using the Grant]		●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To ensure that [the Facilities and the products]/[the Facilities]/ [the products] be maintained and used properly and effectively for the implementation of the Project		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
10	To give due environmental and social consideration in the implementation of the Project.		●

*1 B/A : Banking Arrangement, A/P : Authorization to pay) *2 If the environmental screening category is C, No. 10 is unnecessary

5. Soft Component (Technical Assistance) Plan

PREPARATORY SURVEY
FOR
THE PROJECT OF
MICRO-HYDROELECTRIC POWER GENERATION
IN METROPOLITAN AREA OF TEGUCIGALPA
IN
THE REPUBLIC OF HONDURAS

Soft Component Plan

March, 2013

NEWJEC Inc.
JAPAN TECHNO Co., Ltd.

Soft Component (Technical Assistance) Plan

Table of Content

(1) Background for Planning Soft Component

The Grant Aid Project for Environmental and Climate Change Measures of Small-scale Hydroelectric Power Generation in the Metropolitan Area of Tegucigalpa in the Republic of Honduras is to furnish small-scale hydroelectric power facilities with a total installed capacity of 430 kW using the unutilized water-head potential in the existing water treatment plants (Concepcion and Picacho Plants) owned and operated by the National Autonomous Service of Aqueducts and Sewerage (SANAA), which are providing water and sewage services to Tegucigalpa City. The generated energy will be sold to National Electricity Power Company (ENEE) to reduce the payment of power tariffs bearing heavily on the financial status of SANAA, and it provides better services to consumers by reducing water bills, and proper investment in facilities.

This project is not merely about hydroelectric power. It is most important to achieve both effective operational management of the water treatment plants and optimum operation of the hydroelectric power plants in order to maximize the generated energy.

SANAA has sufficient capability to operate and manage the water treatment plants, however SANAA does not own any hydroelectric power plants at present, therefore they have no knowledge of plant operation and maintenance and how to manage an electricity business. Therefore, it is necessary to facilitate capacity building and structure reinforcement. Moreover, it is essential to establish an appropriate management system in order to manage both the water treatment plants and hydroelectric power plants as a single unified system.

SANAA has vast experience in operation, maintenance and management of water treatment facilities, therefore there are mechanical and electrical engineers in their organization. Those engineers have the foundations for mastering hydroelectric generation technology and SANAA is willing to accept the technology transfer and master such technology in their organization. It is believed possible that SANAA can secure the proper engineering staff in order to support personnel capacity building and establish the necessary organization.

The water and sewerage service is slated to be legally transferred from SANAA to Tegucigalpa City in October 2013. SANAA is responsible with regard to the transfer of the water service business and the implementation of this Project until completion, even if the water service business has been transferred in the course of the project implementation. Therefore, it is believed not to impact this Project.

After completion of the Project, the hydroelectric power plants are also planned to be transferred to the Tegucigalpa City, however the water service in Tegucigalpa City after transfer is scheduled to be operated, maintained and managed by the engineers of SANAA from the view point of technical know-how and capacity. Therefore, the operation, maintenance and management technologies for sustainable operation of these power plants are to be transferred to SANAA.

(2) Objective of Soft Component

The objective is to establish a management system for proper operation, maintenance and management of the existing water treatment facilities and hydroelectric power plants to be provided in this project by the implementing agency, i.e. SANAA, and sustainably manage the electricity business and water supply service.

(3) Anticipated Achievements of Soft Component

The following outcomes are anticipated if the above-mentioned goals are achieved.

i) Establishment of a proper management system and institution for electricity business

ii) Establishment of a proper management system for the hydroelectric power plants

iii) Establishment of a proper management plan and method of water distribution in coordination with power generation operation and facilities

(4) Confirmation Method of Achievement of Soft Component

Soft components will be implemented two (2) times, once in the course of construction and the other one immediately after commissioning the plants (completion of construction). The achievements of the soft component will be confirmed in the second soft component.

Each outcome is confirmed by the following method, and relevant reports are prepared as deliverables. Specific indicators are to be determined, in consultation with SANAA, by the time the soft component is commenced.

A. Establishment of Proper Management System and Institution for Electricity Business

1) Management System

- The hydroelectric power plant team for operation and maintenance of power plant facility is strengthened.
- Operators and maintenance staffs understand the basic knowledge of the hydroelectric power technologies.
- Operators and maintenance staff understand the basic knowledge (functions and structures) of the hydroelectric power plants, and power distribution and water treatment facilities.

2) Management Institution

- Management procedures for the electricity business are prepared and developed.
- A documentation management system for the hydroelectric power plant team is developed.
- Balance sheet reports for electricity business are prepared. (Monthly and annual reports)
- A monitoring system from SANAA is established.
- Ledgers of facilities, spare parts and equipment are prepared and maintained.

3) Monitoring System

- Periodic monitoring forms are prepared, contents for monitoring are understood and on-the-job training is carried out.
- Periodic monitoring of the facilities is carried out and the results are reported.

B. Establishment of Proper Operation and Maintenance System of Power Generation Facilities

1) Operation and Maintenance of Hydroelectric Power Plants Harmonized with Operation of Water Treatment Facilities

- Operation procedures of the hydroelectric power plants are prepared, procedures and

contents are understood and on-the-job training is carried out.

- Operators understand the work flow and scope of responsibility, and perform their work properly.
- Operators prepare daily operation records, carry out daily inspections and proper operation.
- Power plants are operated without any trouble to water distribution operations.
- Maintenance staff understand the work flow and scope of responsibility, and perform their work properly.
- Spare parts and consumables are properly managed.

2) Countermeasures for Accidents and Emergencies

- A manual of countermeasures to accidents and emergencies is prepared and developed.
- Operators and maintenance staff acquire knowledge of countermeasures for accidents and emergencies.
- As part of the countermeasures to accidents and emergencies, troubleshooting documents are prepared, training by case study is conducted and the ability to cope with troubles is acquired.
- The flow of emergency communications, including the contact company name, address, telephone number, and e-mail address to use in times of accident or emergency, is established. (Japanese and Honduras manufacturers)

3) Appropriate Mid- and Long-term Maintenance Plan in Consideration of Effects of Water Treatment Facilities.

- Mid- and long-term maintenance plans for overhaul and replacement of major parts are prepared.
- Budgetary plans are prepared for mid- and long-term maintenance.

C. Establishment of Proper Management Plan and Method of Water Distribution in Coordination with Power Generation Operation and Facilities

1) Proper Management Plan for Water Distribution in Coordination with Power Generation Operation

- A appropriate management plan for water distribution in coordination with power generation operation is prepared.

2) Proper Management Method of Water Distribution in Coordination with Power Generation Operation

- Operation procedures for water distribution in coordination with power generation operation are prepared, flow and contents of the procedure are understood and on-the-job training is carried out.

(5) Activities on Soft Component (Input Schedule)

To achieve the above-mentioned three (3) accomplishments, the following activities are to be implemented.

The soft component aims to facilitate capacity building in operation and maintenance for both the hydroelectric power plants and water treatment facilities, and to develop system and hydroelectric power plant team as the main management organization. The soft component is to provide assistance so that project operation starts smoothly and the hydroelectric power plants are sustainably operated, maintained and managed.

Therefore, the soft component enables the new hydroelectric power plant team to prepare and develop management procedures for the electricity business, and operation and maintenance procedures for the hydroelectric power plants, which explain concrete work flows and methods for each work item in order to smoothly manage the power plants from the very beginning.

Prior to imparting the soft component, guidance on initial operation of facilities and equipment, and explanations on maintenance and management methods are to be carried out by the Contractor and manufacturers. The manufactures are to provide detailed operation and maintenance manuals for each piece of equipment to be installed, but these manuals alone are not enough to consistently and successfully manage both the hydroelectric power plants and water treatment facilities.

Maintenance to be done by the engineers of SANAA in the soft component is for daily inspections and minor maintenance works. Large-scale overhauls and replacement of major spare parts are to be done by the manufacturers in accordance with the established mid- and long-term maintenance plans.

1) Establishment of Proper Management System and Institution for Electricity Business

a) Target Group

Operators and maintenance staff of power plants, Maintenance staff from SANAA, SANAA persons in charge of monitoring and persons from ENEE's planning section

b) Period

1 time (After construction)
In Japan 0.8 month
In Honduras 0.83 month (Immediately after construction completion)

c) Resources

Japanese consultant
Team Leader / Management of electricity business: 1 person
(In Japan 0.8 MM; In Honduras 0.83 MM)

d) Work Items and Methods

Work Items	Method
Explanation to and discussion with SANAA persons in charge	Information is to be shared among all related personnel in order to conduct efficient activities.
1) Seminar on power generation plan and electricity business	Seminar on preparing management procedures for an electricity business. Discussions with SANAA are to focus on proper water distribution plans and management methods in coordination with power generation.
2) Preparation of balance sheet reports	Seminar on preparing monthly and annual reports on finances, with knowledge transfer by OJT. Proper revisions are to be made based on the results of OJT.

Work Items	Method
3) Management of facilities, spare parts and equipment	Ledgers of facilities, spare parts and equipment are to prepared and guidance provided by OJT. Based on the results of OJT, revisions are to be made.
4) Preparation of monitoring plans for power plants, and power distribution and water treatment facilities	Effective monitoring systems and methods are to be prepared through discussion with the relevant agencies. Monitoring forms are to be prepared and guidance imparted by OJT.
5) Management of electricity business, preparation of forms for monitoring and procedures	As the result of OJT and discussions with SANAA, matters are to be revised and finalized.

e) Kinds of Reports and Documents

Management procedures for electricity business, activity status reports, ledgers of facilities and spare parts, financial balance reports, periodic monitoring forms, etc.

2) Establishment of Proper Operation and Maintenance System for Power Generation Facilities

a) Target Group

Operators and maintenance staff of power plants, Maintenance staff from SANAA, and persons from ENEE's planning section

b) Period

Two (2) times (During construction and immediately after completion of plant)
In Japan 0.8 month
In Honduras 0.5 month (During construction)
0.83 month (Immediately after construction completion)

c) Resources

Japanese consultant
Electro-mechanical technology expert : 1 person
(In Japan 0.8 MM; in Honduras 1.16 MM)
Water supply technology expert : 1 person
(In Japan 0.8 MM; in Honduras 1.33 MM)

In addition, in relation to the power plant and distribution facilities, ENEE engineers will be requested to cooperate as local resources.

d) Work Items and Methods

Work Items	Method
Explanation to and discussion with SANAA person in charge	Information is to be shared among all related personnel in order to conduct efficient activities.
1) Seminar on basic hydroelectric power technology	Seminar is to be conducted on basic hydroelectric power technologies.
2) Seminar on basic technologies on hydroelectric power plants and water treatment facilities	Seminar is to be conducted on the design and functions of hydroelectric power plants and water treatment facilities.
3) Management of hydroelectric power plant operation	Operation procedures for the power plants are to prepared and guidance imparted by OJT.

Work Items	Method
	Daily operation reports and inspection records are to be prepared and guidance imparted by OJT. Based on the results of OJT, revisions are to be made.
4) Countermeasures in times of accident or emergency	Countermeasure manual for accidents and emergencies is to be prepared and a seminar held. Emergency communication flow and list of repair /maintenance companies
5) Confirmation of operations and daily inspections of hydroelectric power plants	Confirmation as to whether operations and inspections are carried out in accordance with procedures are to be made at the 2 sites.
6) Preparation of final version of forms and procedures for management of hydroelectric power plants	As the result of OJT and discussions with SANAA, procedures and documents are to be revised and finalized.
7) Preparation of mid- and long-term maintenance plans considering effects of and on water treatment facilities	Schedule of large-scale overhauls and replacement of major parts and related budgets are to be prepared.

Remarks : Activity 1) provides guidance only on maintenance of turbines/generators, while 2) to 8) are be conducted by both experts.

e) Kinds of Reports and Documents

Management procedures for hydroelectric power plants, activity status reports, countermeasure manuals for accidents and emergencies, emergency communication flow, list of repair/maintenance companies

3) Establish Proper Management Plan and Method of Water Distribution in Coordination with Power Generation Operation and Facilities

a) Target Group

Operators and maintenance staff of power plants, Maintenance staff of SANAA

b) Period

Refer to 2) b).

c) Resources

Japanese consultant
Water supply technology expert: 1 person (Including MM refer to 2) c).)

d) Work Items and Methods

Work Items	Method
1) Preparation of management plans for water distribution (draft) and reference for water distribution management method	Seminar is to be conducted on preparing management plans for water distribution (draft) in coordination with power plants.
2) Preparation of management plans for water distribution and seminar and discussions on management methods for water distribution	Discussions with SANAA are to focus on the final management plan for water distribution and management method for water distribution in coordination with power plants.

e) Kinds of Reports and Documents

Management plans for water distribution, management procedures for water distribution, activity status reports

(6) Resources for Soft Component

This Project is to install small-scale hydroelectric power plants at two (2) water treatment facilities operated by SANAA, and SANAA is responsible for proper operation, maintenance and management of the power plants. As SANAA does not own any hydroelectric power plants, SANAA has no experience in operating, maintaining and managing a power plant or an electricity business. However, SANAA has vast experience in the operation, maintenance and management of water treatment facilities, therefore there are mechanical and electrical engineers in their organization. Those engineers have the foundations for mastering hydroelectric power technologies, and SANAA is willing to accept the technology transfer and master such technology in their organization. Thus, it is believed that SANAA can secure the proper human resources for operating and maintaining the power plants in their organization.

As for the transfer of technologies, it is suitable that Japanese consultants specialized in the operation and maintenance of hydroelectric power plants and water treatment facilities provide guidance to SANAA. As a local resource for the technology transfer, technical assistance is requested of ENEE, which operates, maintains and manages hydroelectric power plants and power distribution facilities in Honduras. As the activities, all seminars and OJT are to be conducted in Spanish, thus Japanese interpreters are to be arranged and dispatched so that SANAA engineers understand clearly the technical terms related to hydroelectric power and water treatment technologies.

For the sustainable operation of the hydroelectric power plants in the future, it is effective to obtain technical support from ENEE, which possess ample knowledge and experience with power plant technology, in addition to obtaining cooperation from electrical and mechanical maintenance groups from SANAA.

(7) Implementation Schedule of Soft Component

This Project is implemented within a period of 24 months after the conclusion of the Exchange of Notes (E/N). The construction period is estimated to be 16 months including procurement, construction of facilities, transportation of equipment and materials, installation, testing and trial operation.

Prior to the commencement of construction, the E/N, consultant’s contract, detailed designs, preparation of bidding documents, bidding, bid evaluation, and contractor’s contract are to be concluded. The overall implementation schedule and detailed schedule of the soft component are shown in Tables 1, 2 and 3, respectively.

Table 1 Overall Implementation Schedule (Draft) of Soft Component

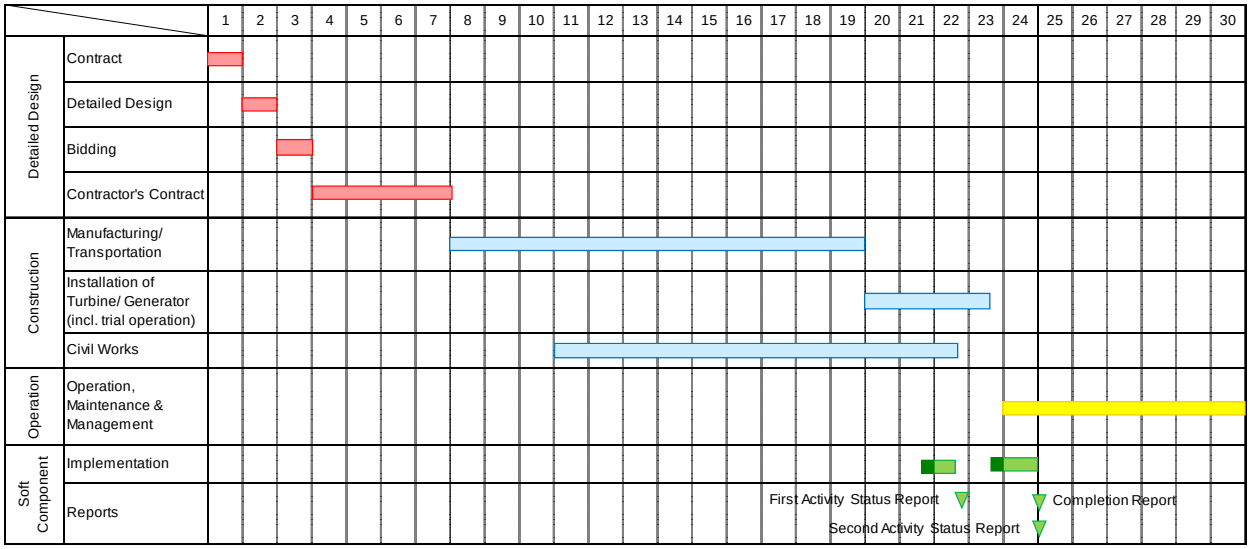


Table 2 Detailed Schedule of Soft Component during Construction (Draft)

			Works in Japan	Works in Honduras	
Item	Activity		-1st week	1st week	2nd week
Contents of Activity	Preparation of training materilals on basic hydroelectric power generation		■		
	Preparation of training materilals on water distribution plan and operation (draft)		■		
	Preparation of training materilals on design, function, structure on hydroelectric power and water distribution facilities		■		
	Explanation & discussion on Soft Component (draft) to SANAA	at 2 sites combined		■	■
	Seminar on basic hydroelectric power generation	at 2 sites combined		■	
	Seminar on water distribution plan and operation (draft)	at 2 sites combined		■	
	Seminar on design, function, structure on hydroelectric power and water distribution facilities	at 2 sites combined			■
Trainer	Turbine/Generator Expert	1 person	■	■	■
	Water Supply Facility Expert	1 person	■	■	■

Table 3 Detailed Schedule of Soft Component after Project Completion (Draft)

Item	Activity		Works in Japan			Works in Honduras (after commissioning)			
			-3rd week	-2nd week	-1st week	1st week	2nd week	3rd week	4th week
Contents of Activity	Preparation of training materials on generation plan & power generation business management								
	Preparation of forms, manuals, etc for power generation business								
	Preparation of documents for periodical monitoring plan								
	Preparation of training materilals on water distribution plan and operation								
	Preparation of operation diary, inspection forms, manuals, etc.								
	Preparation on medium- and long-term maintenance plan and schedule								
	Seminar on generation plan & power generation business - Discussion on organization, legislation & system - Generation plan & power generation business management	at 2 sites combined							
	On-the-Job Training on power generation business - Preparation of financial balance report - Preparation of lodger	at 2 sites combined							
	Operation & daily inspection seminar and On-the-Job training for generation, distribution line & water distribution facilities	Concepcion							
		Picacho							
	Seminar on countermeasures at the time of accident & emergency for generation, distribution line & water distribution facilities	Concepcion							
		Picacho							
	Preparation & discussion of periodic monitoring plan	at 2 sites combined							
	Preparation & discusion of medium- and long-term maintenance plan and schedule	at 2 sites combined							
	Confirmation of monitoring operation and condition of operation & daily inspection for generation, distribution line & water distribution facilities	Conception							
		Picacho							
Trainer	Team Leader/Power Generation Business	1 person							
	Turbine/Generator Expert	1 person							
	Water Supply Facility Expert	1 person							

(8) Deliverables of Soft Component

The deliverables of the soft component are listed below.

Table 4 Deliverables of Soft Component

Items	Time of Submission
1. Completion Report	After completion
2. Activity Status Report	
1) During construction	After conducting the first training
2) After project completion	After conducting the second training (Including the results of On-the-Job Training)
3. Management procedures for electricity business	After completion
4. Operation and maintenance procedures for power generation and distribution facilities	After completion (Including operation daily record, daily inspection report, inspection/maintenance records and countermeasures to accidents and emergencies)
5. Management plan for water distribution in coordination with power plants	After completion (Including inspection and maintenance records, and countermeasures for emergencies)
6. Management procedures for water distribution in coordination with power plants	After completion (Including inspection and maintenance records, countermeasures to accidents and emergencies)
7. Periodic monitoring forms	After completion
8. Ledger of facilities and spare parts	After completion
9. Mid- and long-term maintenance plan	After completion

(9) Obligation of Implementing Agency of Honduras

For sustainable and proper operation, maintenance and management of the hydroelectric power plants constructed by this Project, the implementing agency, i.e. SANAA should have the following responsibility. The water treatment plants of Tegucigalpa City are scheduled to be transferred to the Tegucigalpa Municipal Office by law, and these two (2) hydroelectric power plants are expected to be included, too. However, it is planned to keep the operation, inspection and maintenance of the power plants in the hands of SANAA. Therefore, the target group of the technology transfers via the soft component is the staff of SANAA.

1) Responsible persons and counterpart engineers of SANAA required for the implementation of s the oft component are to be secured.
2) A budget for the implementation of the soft component is to be secured by SANAA.
3) Operators and maintenance staff of the hydroelectric power plants are to be selected.
4) Operators and maintenance staff of the hydroelectric power plants who learn about the technologies are to continue working at the plants.
5) Successors to the operators and maintenance staff of the power plants are to be trained.
6) A continuous monitoring system for the hydroelectric power plants is to be established by SANAA.
7) Continuous technical assistance from ENEE in the maintenance and management of the hydroelectric power plant facilities is to be expected.
8) Financial support is to be provided by the government of Honduras against large-scale accidents, natural disasters, etc.