

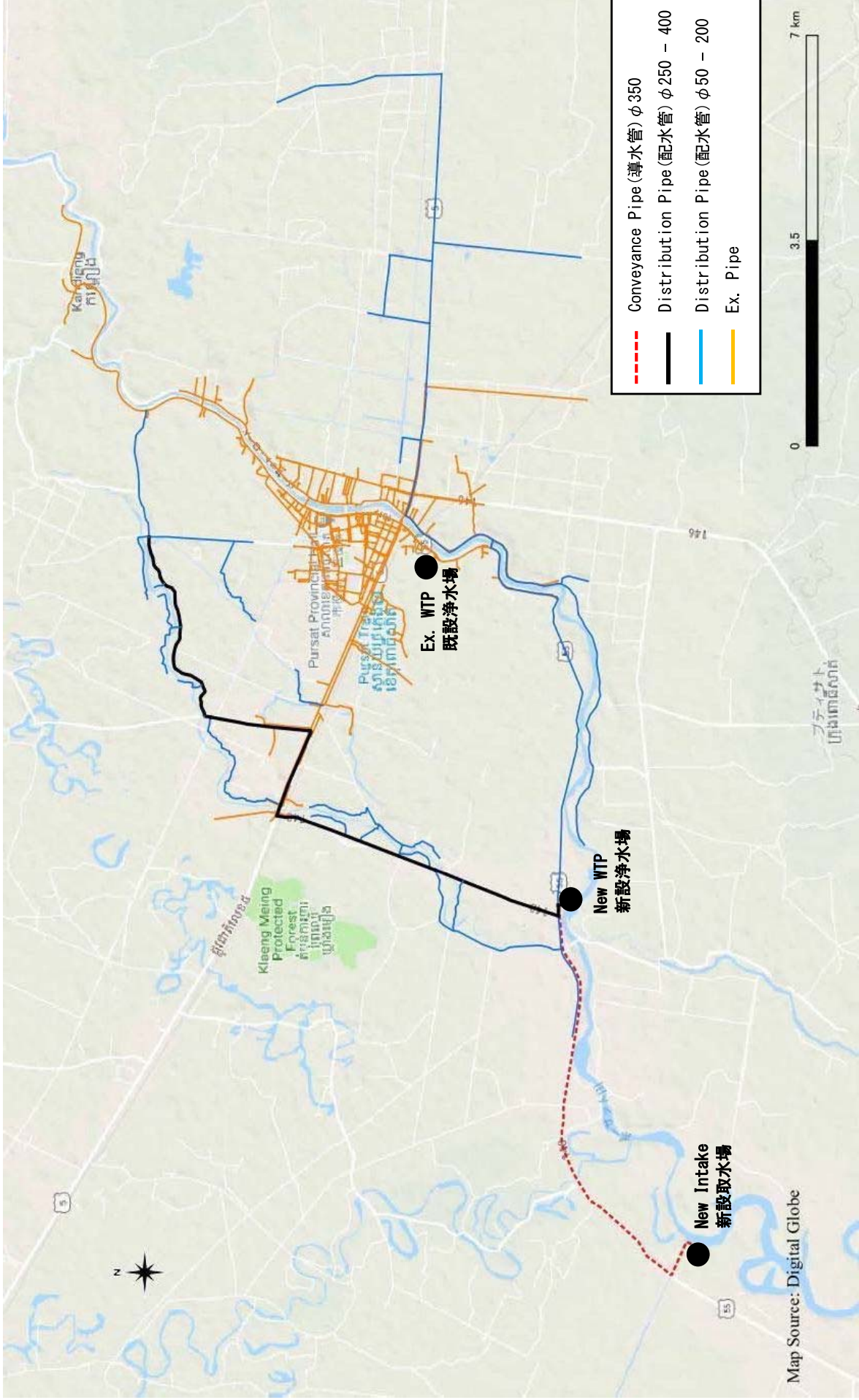
資料 7.2

概略設計図

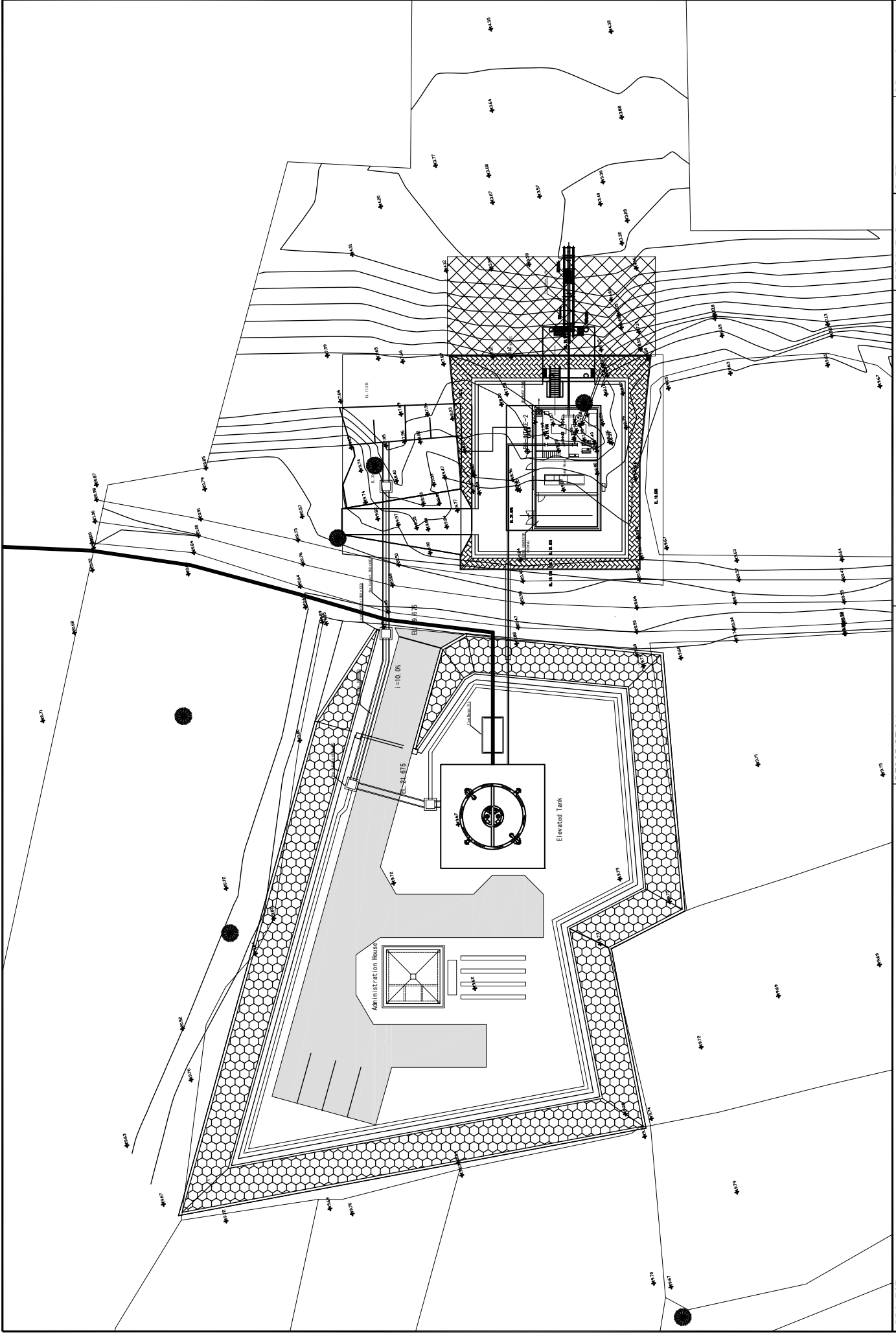
概略設計図を以下に示す。

No.	FACILITY CLASIFICATION	Description	DRAWING No
1.	General (G)	General Layout of Pursat	G1
2.	Intake Facility (I)	Intake Facilities (1)	PI-1
		Intake Facilities (2)	PI-2
		Elevated Tank	PI-3
		Pump House Plan	PI-4
		Pump House Section	PI-5
		Office Plan, Section, Elevation	PI-6
3.	Raw Water Transmission Facility (R)	General Map for Conveyance Pipeline	PR-1
		Conveyance Pipeline Plan (1)	PR-2
		Conveyance Pipeline Plan (2)	PR-3
		Conveyance Pipeline Plan (3)	PR-4
4.	Treatment Facility (T)	Water Treatment Plant General Plan	PT-1
		Hydraulic Profile of Pursat Water Treatment Plant	PT-2
		Water Treatment Facilities Structure (1)	PT-3
		Water Treatment Facilities Structure (2)	PT-4
		Water Treatment Facilities Structure (3)	PT-5
		Water Treatment Facilities Structure (4)	PT-6
		Water Treatment Facilities Structure (5)	PT-7
		Water Treatment Facilities Structure (6)	PT-8
		Water Treatment Facilities Structure (7)	PT-9
		Water Treatment Facilities Structure (8)	PT-10
		Water Treatment Facilities Structure (9)	PT-11
		Service Reservoir and Pumping Station Structure (1)	PT-12
		Service Reservoir and Pumping Station Structure (2)	PT-13
		Service Reservoir and Pumping Station Structure (3)	PT-14
		Drainage Basin Structure	PT-15
		Drying Bed Structure	PT-16
5.	Distribution Facility (D)	Location Map for Distribution Pipe Line	PD-1
		Distribution Pipe Plan (1)	PD-2
		Distribution Pipe Plan (2)	PD-3
		Distribution Pipe Plan (3)	PD-4
		Distribution Pipe Plan (4)	PD-5
		Distribution Pipe Plan (5)	PD-6
		Distribution Pipe Plan (6)	PD-7
		Distribution Pipe Plan (7)	PD-8
		Distribution Pipe Plan (8)	PD-9
		Distribution Pipe Plan (9)	PD-10
		Distribution Pipe Plan (10)	PD-11
		Distribution Pipe Plan (11)	PD-12
		Distribution Pipe Plan (12)	PD-13
		Distribution Pipe Plan (13)	PD-14
		Distribution Pipe Plan (14)	PD-15
		Distribution Pipe Plan (15)	PD-16
Distribution Pipe Plan (16)	PD-17		

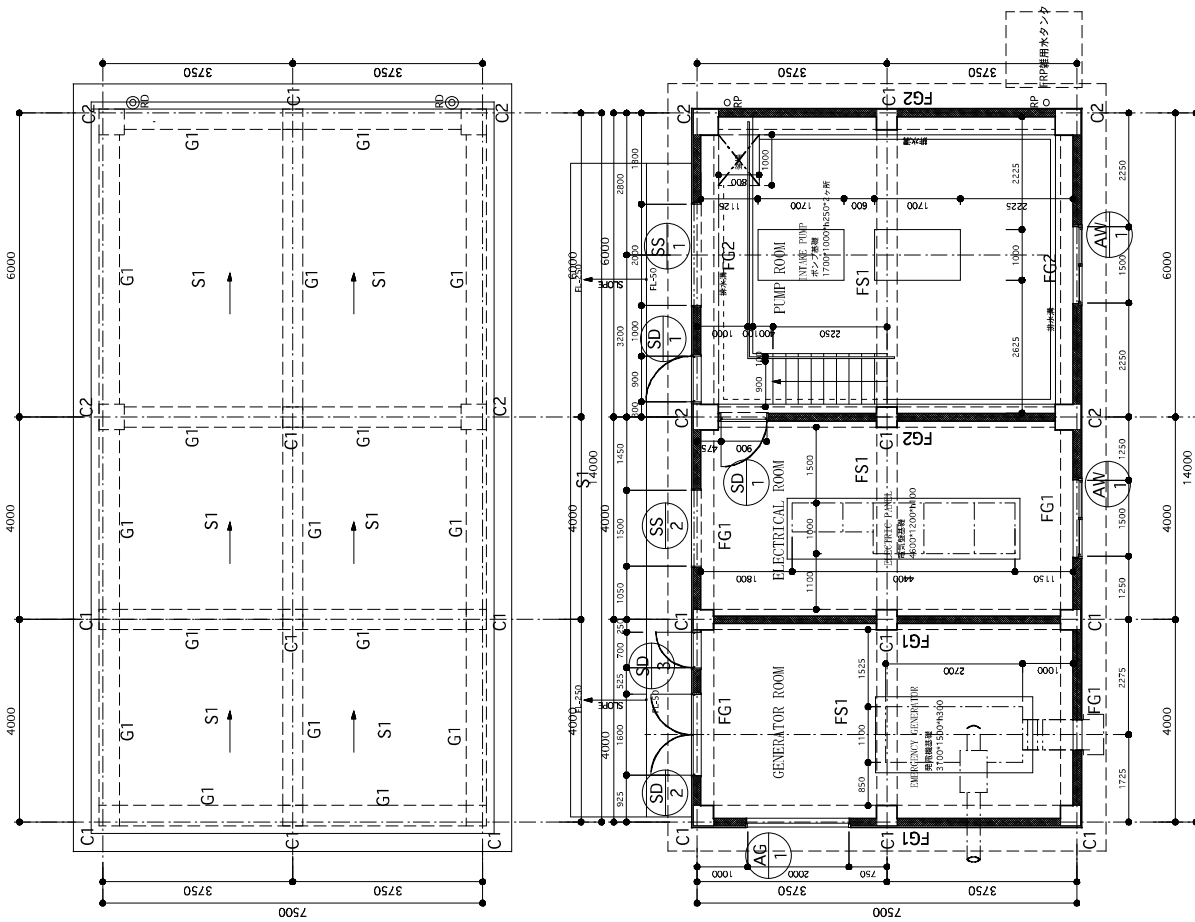
No.	FACILITY CLASIFICATION	Description	DRAWING No
		Distribution Pipe Plan (17)	PD-18
		Distribution Pipe Plan (18)	PD-19
		Typical Drawing for Pipe Laying (1)	TYP-1
		Typical Drawing for Pipe Laying (2)	TYP-2
		Typical Drawing for Pipe Laying (3)	TYP-3
		Typical Drawing for Pipe Laying (4)	TYP-4
		Typical Drawing for Pipe Laying (5)	TYP-5
		General Earth Work for Pipe Laying	TYP-6
		Typical Drawing for Sluice Valve	TYP-7
		Typical Drawing for Installation of Air Valve and Washout	TYP-8
		Typical Drawing for Pipe Beam ND200	TYP-9
		Typical Drawing for Pipe Beam ND80	TYP-10
		Typical Drawing for Bridge Attached Pipe	TYP-11



PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	General Map	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING NO
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
							61



PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION Intake Facilities (1)	MINISTRY OF INDUSTRY AND HANDICRAFT CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
				PREPARED BY	DATE	SCALE

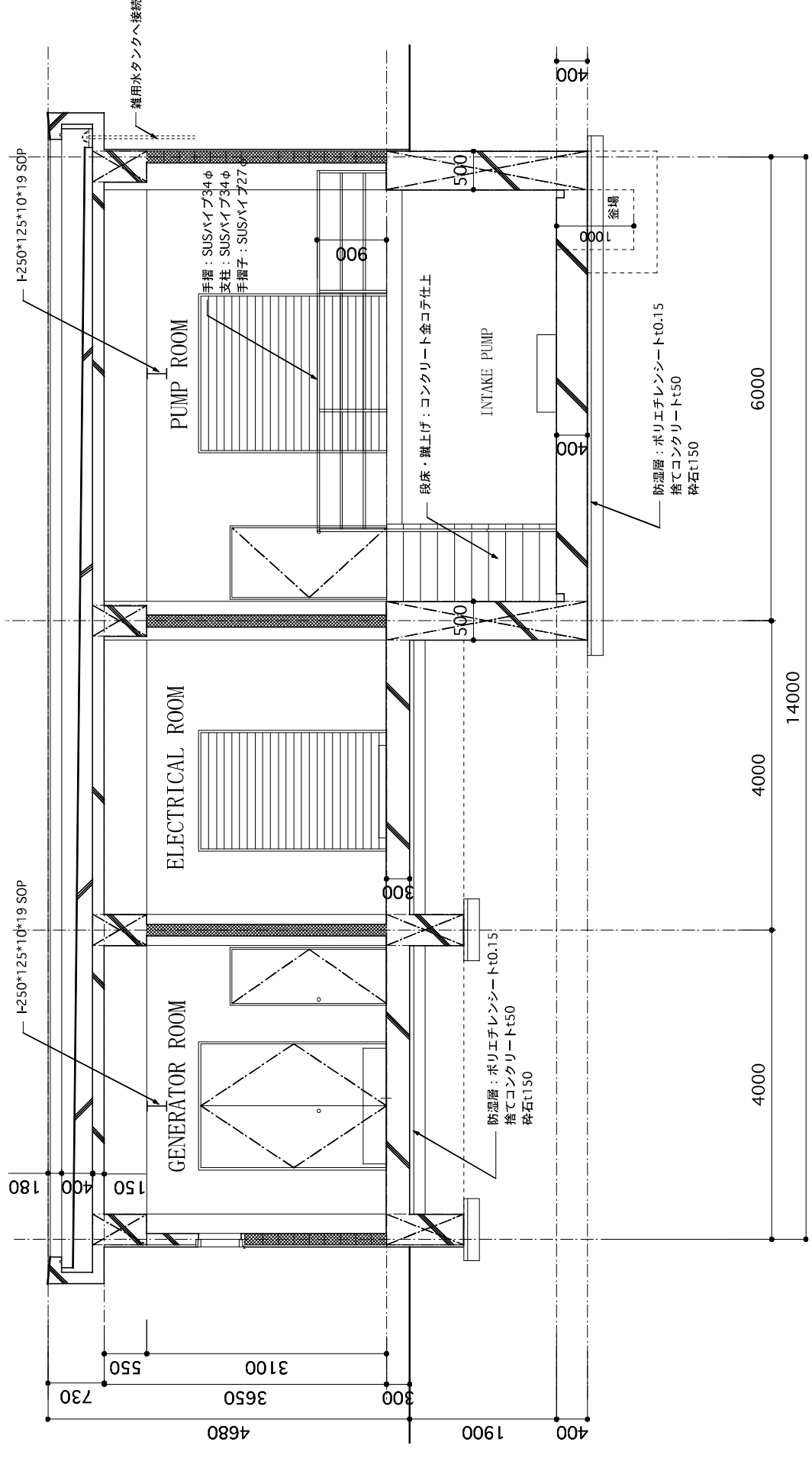


構造部材断面
 柱C1:400角
 柱C2:500角
 梁G1:W400*H700
 基礎梁FG1:W400*H1000
 基礎梁FG2:W500*H2600
 スラブS1:t:150
 土間スラブFS1:t:300
 耐圧盤FS2:t:400

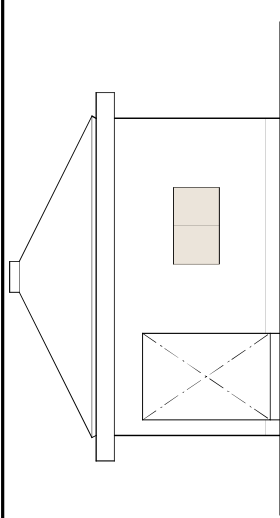
部位	仕上
屋根	アスファルト防水、保護コンクリートt250-50
軒先	打放しコンクリートAEP
階床	塩ビカラーハイブリッドφ
外壁	モルタル金コ字仕上t25AEP、コンクリートブロックt150下地
柱	モルタル金コ字仕上t25AEP、コンクリート下地
外廊扉	スチール製ドア
外戸木	モルタル金コ字仕上
地下外壁	改質アスファルト防水(後やり工法)、コンクリート下地

名称	床	巾木	壁	天井
ポンプ室	コンクリート金コ字仕上	コンクリートブロックt150	コンクリートブロックt150	天井
電気室	コンクリート金コ字仕上	コンクリート打放し補修(地下室)	コンクリート打放し補修(地下室)	コンクリート打放しのまま
発電機室	コンクリート金コ字仕上	コンクリートブロックt150	コンクリートブロックt150	コンクリート打放しのまま

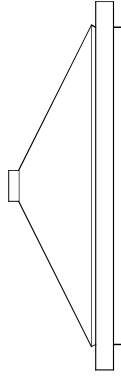
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT	DESCRIPTION	PUMP HOUSE PLAN ROOF PLAN FINISH SCHEDULE	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE 1 : 100



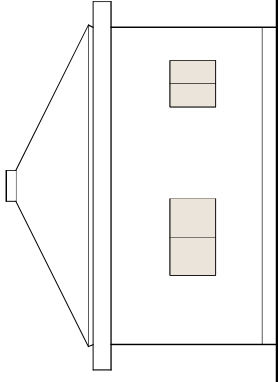
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT		DESCRIPTION	PUMP HOUSE DETAIL SECTION		MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
				PREPARED BY	DATE		SCALE 1 : 50		



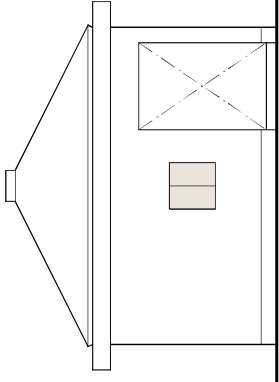
北立面図



西立面図



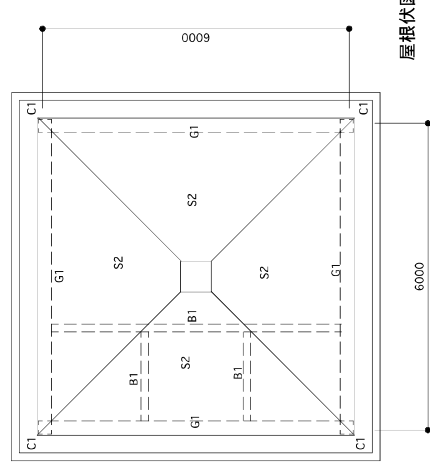
南立面図



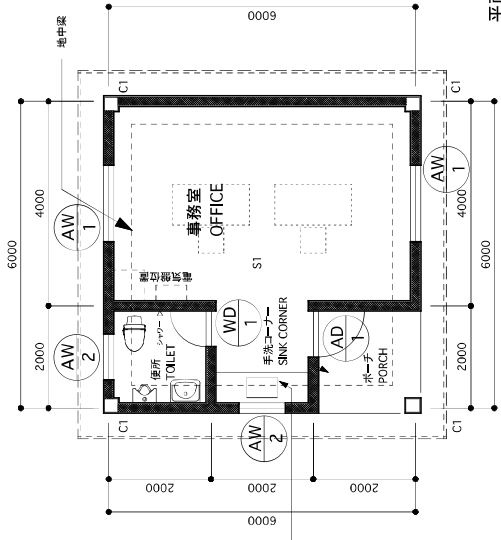
東立面図

柱C1:250角
梁G1:W250*H600
臥梁B1:W150*H450
床スラブS1:t:150
屋根スラブS2:t:150
地中梁SFG1:W1000*H600(図示)

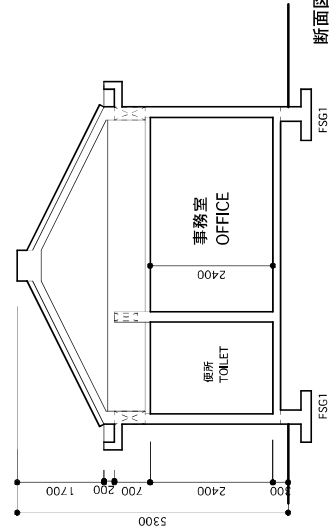
カクタンター(シンク角)トラノ



屋根伏図

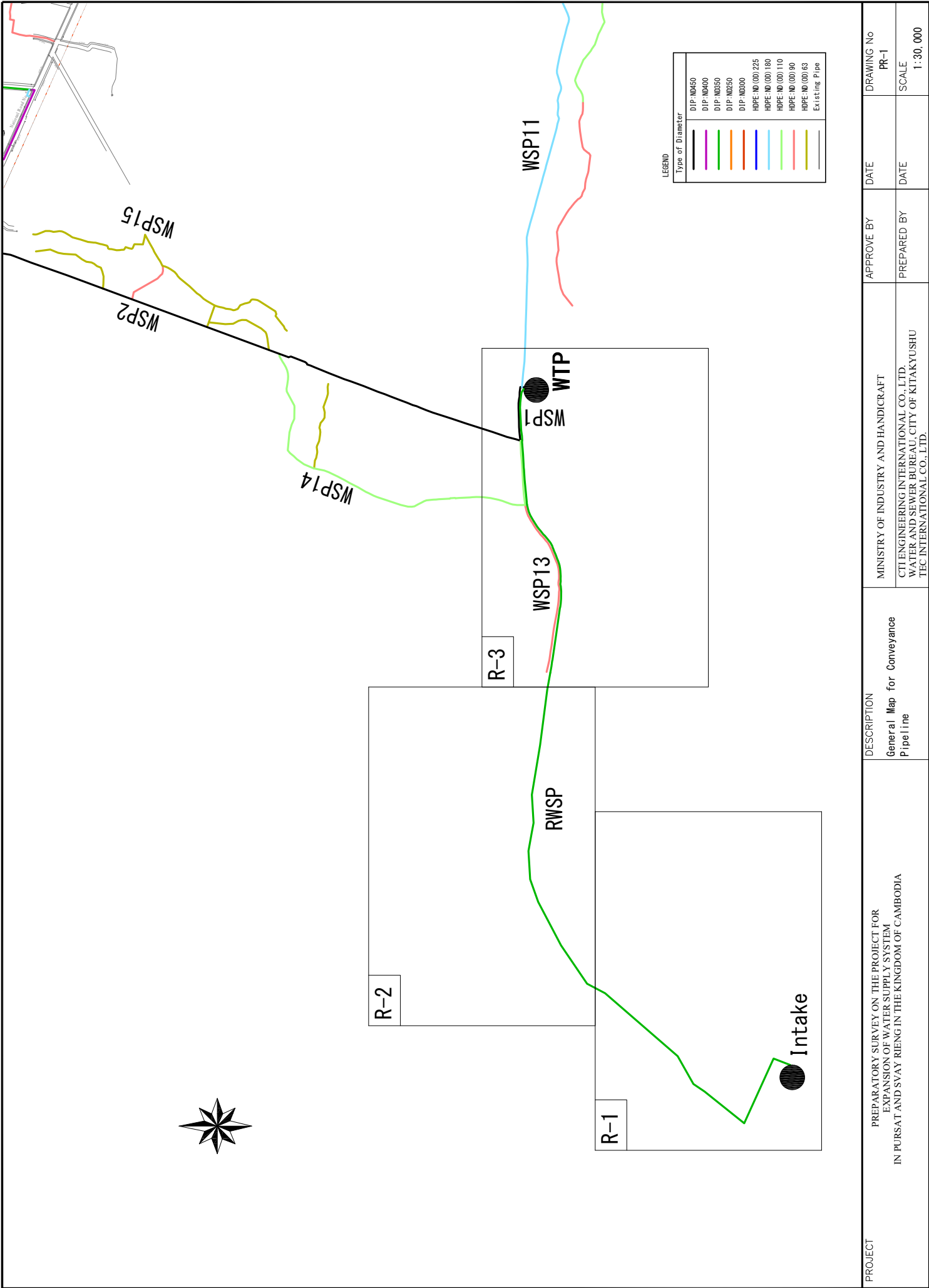


平面図



断面図

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURKSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION Office Plan, Section, Elevation	MINISTRY OF INDUSTRY AND HANDICRAFT		APPROVE BY	DATE	DRAWING No
	CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.		PREPARED BY	DATE	SCALE 1:100		



PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEM
IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION
General Map for Conveyance
Pipe line

MINISTRY OF INDUSTRY AND HANDICRAFT
CTI ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

APPROVE BY

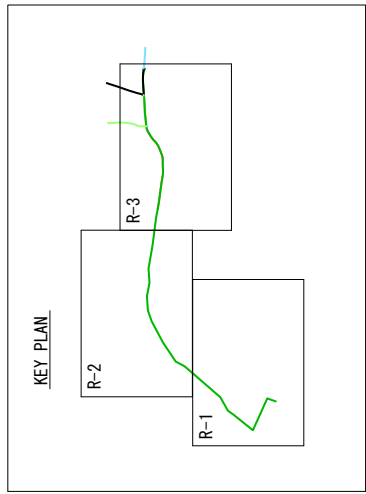
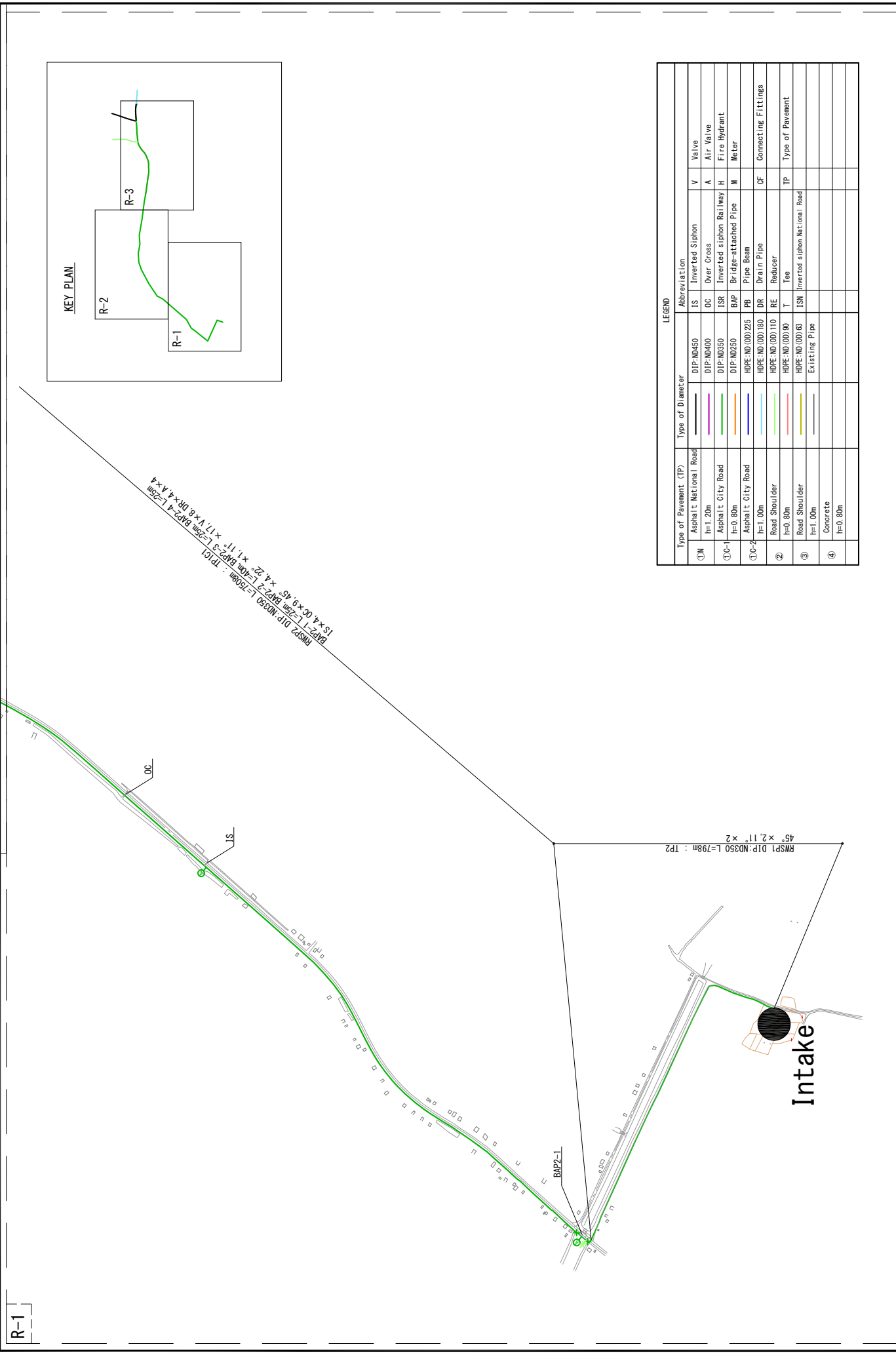
DATE

DRAWING No

PR-1

SCALE

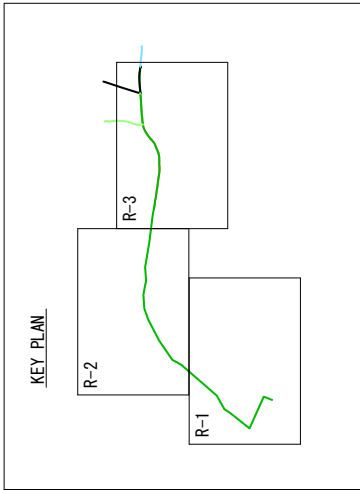
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LEGEND

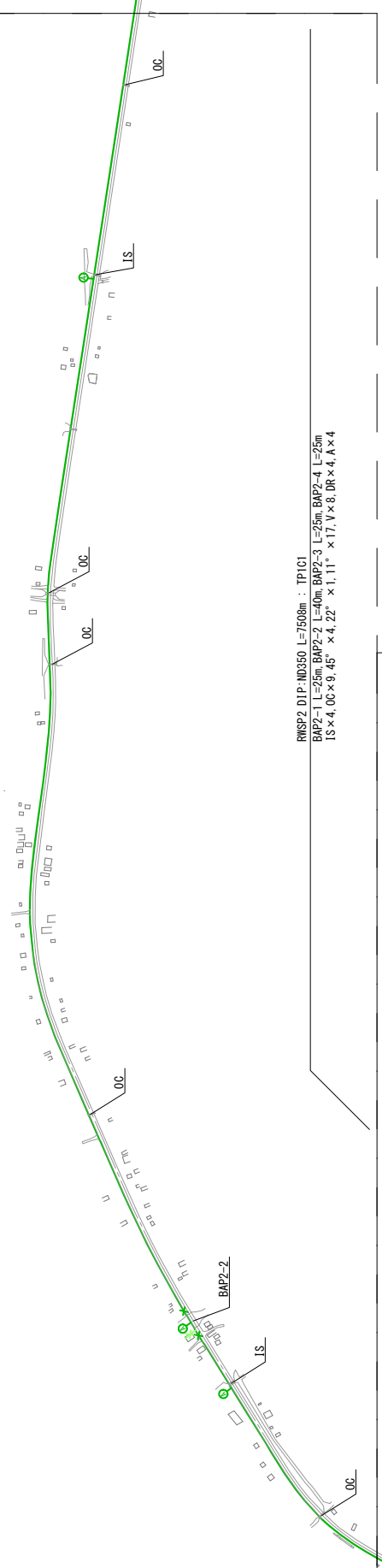
Type of Pavement (TP)	Type of Diameter	Abbreviation	Valve
Asphalt National Road	DIP:ND450	IS Inverted Siphon	V Valve
Asphalt City Road	DIP:ND400	OC Over Cross	A Air Valve
Asphalt City Road	DIP:ND350	ISR Inverted siphon Railway	H Fire Hydrant
Asphalt City Road	DIP:ND350	BAP Bridge-attached Pipe	M Meter
Asphalt City Road	HDPE:ND(OD)225	PB Pipe Beam	CF Connecting Fittings
Road Shoulder	HDPE:ND(OD)180	DR Drain Pipe	TP Type of Pavement
Road Shoulder	HDPE:ND(OD)110	RE Reducer	
Road Shoulder	HDPE:ND(OD)90	T Tee	
Concrete	HDPE:ND(OD)63	ISN Inverted siphon National Road	
	Existing Pipe		

PROJECT PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION Conveyance Pipe line Plan(1)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No PR-2
		CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE 1:8,000



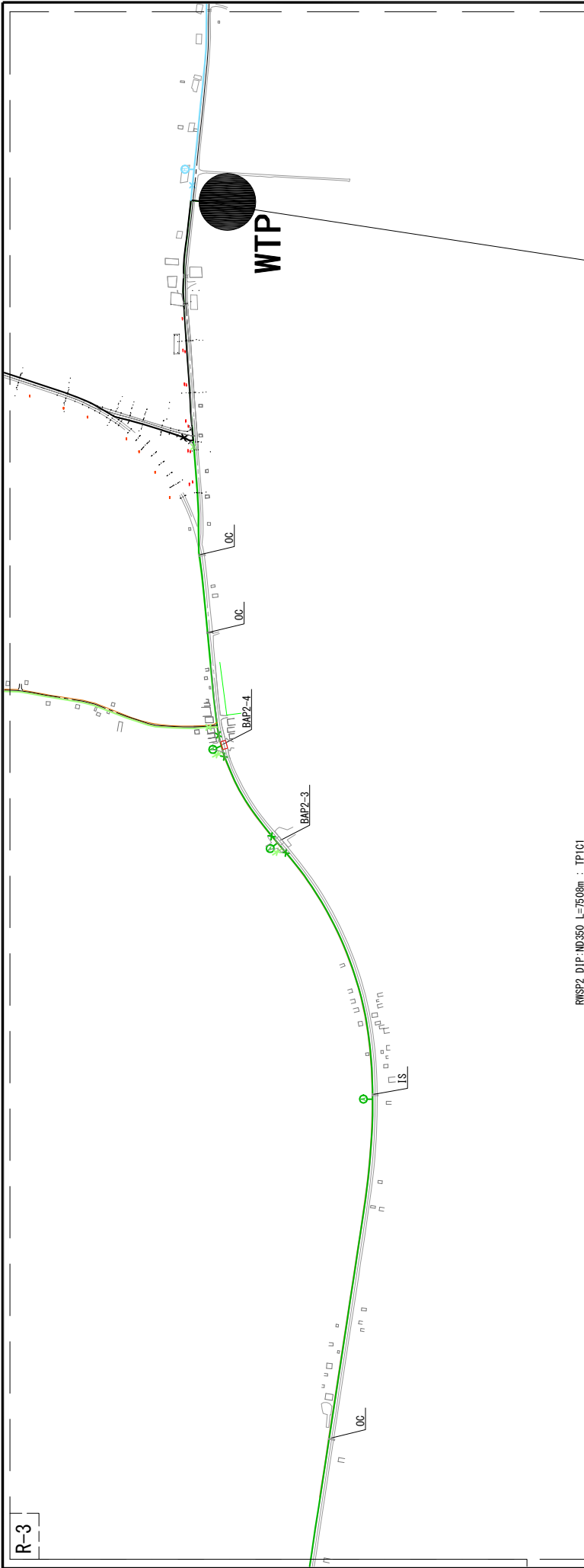
LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation
①N Asphalt National Road h=1.20m	DIP-ND450	IS Inverted Siphon
①C-1 Asphalt City Road h=0.80m	DIP-ND400	OC Over Cross
①C-2 Asphalt City Road h=1.00m	DIP-ND350	ISR Inverted siphon Rail way
② Road Shoulder h=0.80m	DIP-ND250	BAP Bridge-attached Pipe
③ Road Shoulder h=1.00m	HOPE-ND(OD)225	PB Pipe Beam
④ Concrete h=0.80m	HOPE-ND(OD)180	DR Drain Pipe
	HOPE-ND(OD)110	RE Reducer
	HOPE-ND(OD)90	T Tee
	HOPE-ND(OD)63	ISN Inverted siphon National Road
	Existing Pipe	
		V Valve
		A Air Valve
		H Fire Hydrant
		M Meter
		CF Connecting Fittings
		TP Type of Pavement

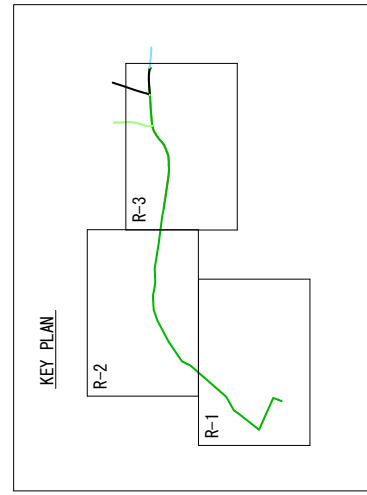


RMSP2 DIP-ND350 L=7506m : TP1C1
 BAP2-1 L=25m BAP2-2 L=40m BAP2-3 L=25m BAP2-4 L=25m
 IS×4, OC×9, 45° ×4, 22° ×1, 11° ×17, V×8, DR×4, A×4

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	Conveyance Pipeline Plan(2)	APPROVE BY	DATE	DRAWING No	PR-3
				MINISTRY OF INDUSTRY AND HANDICRAFT			
				CTI ENGINEERING INTERNATIONAL CO., LTD.			
				WATER AND SEWER BUREAU CITY OF KITAKYUSHU			
				TEC INTERNATIONAL CO., LTD.			
				PREPARED BY	DATE	SCALE	1:8,000

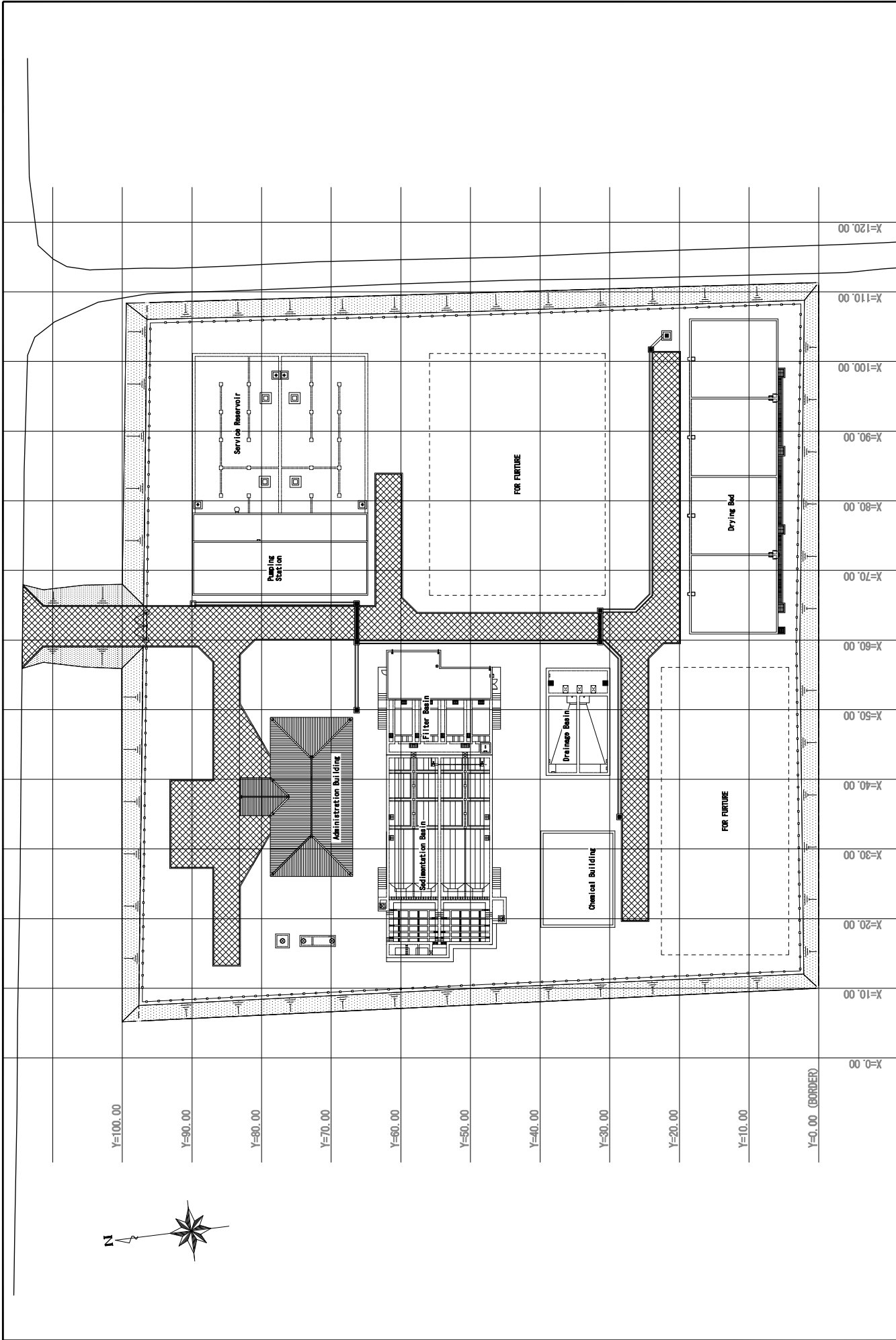


RWS2 DIP-ND350 L=750m : TP101
 BAP2-1 L=25m, BAP2-2 L=40m, BAP2-3 L=25m, BAP2-4 L=25m
 IS x4, OC x9, 45° x4, 22° x1, 11° x17, Y x8, DR x4, A x4



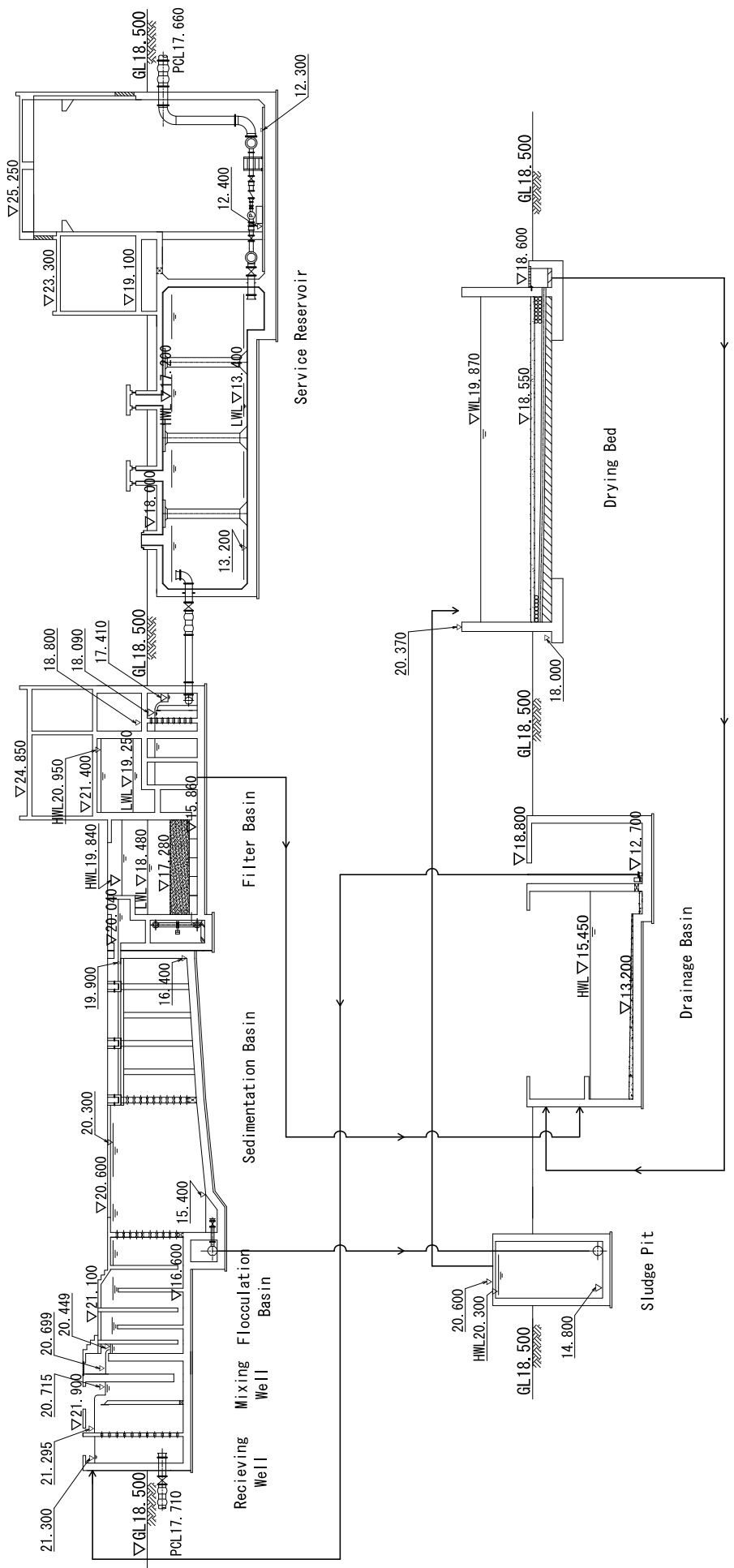
Type of Pavement (TP)		Type of Diameter		Abbreviation		
①N	Asphalt National Road h=1.20m	DIP-ND450	IS	Inverted Siphon	V	Valve
		DIP-ND400	OC	Over Cross	A	Air Valve
①C-1	Asphalt City Road h=0.80m	DIP-ND350	ISR	Inverted siphon Rail way	H	Fire Hydrant
		DIP-ND250	BAP	Br idg-at-Attached Pipe	M	Meter
①C-2	Asphalt City Road h=1.00m	HDPE-ND(OD)225	PR	Pipe Beam	CF	Connecting Fittings
	Road Shoulder h=0.80m	HDPE-ND(OD)180	DR	Drain Pipe	RE	Reducer
	Road Shoulder h=1.00m	HDPE-ND(OD)110	RE	Reducer	T	Te
③	Existing Pipe h=0.80m	HDPE-ND(OD)63	ISN	Inverted siphon National Road	TP	Type of Pavement
④	Concrete h=0.80m	Existing Pipe				

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	CONVEYANCE PIPE LINE PLAN(3)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	PR-4
							SCALE
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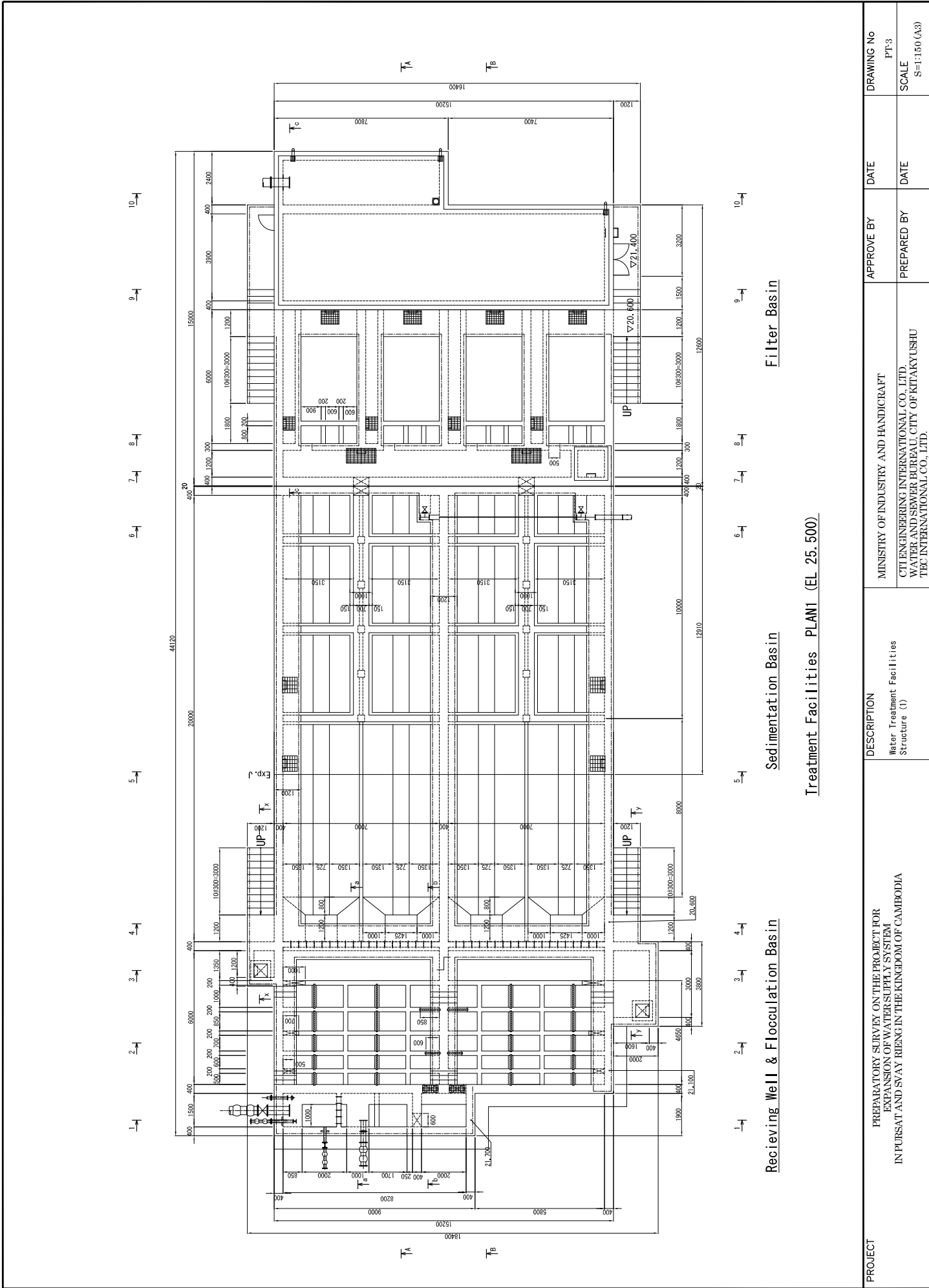


PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN POURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA		DESCRIPTION		MINISTRY OF INDUSTRY AND HANDICRAFT		APPROVE BY	DRAWING No
			Water Treatment Plant General Plan		CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.		PREPARED BY	PT-1
							DATE	SCALE
							DATE	S=1:500 (A3)

FLOW DIAGRAM PURSAT WATER TREATMENT PLAN



PROJECT PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION Hydraulic Profile of Pursat Water Treatment Plant	MINISTRY OF INDUSTRY AND HANDICRAFT CTE ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
			PREPARED BY	DATE	PT-2
			SCALE	NONE	



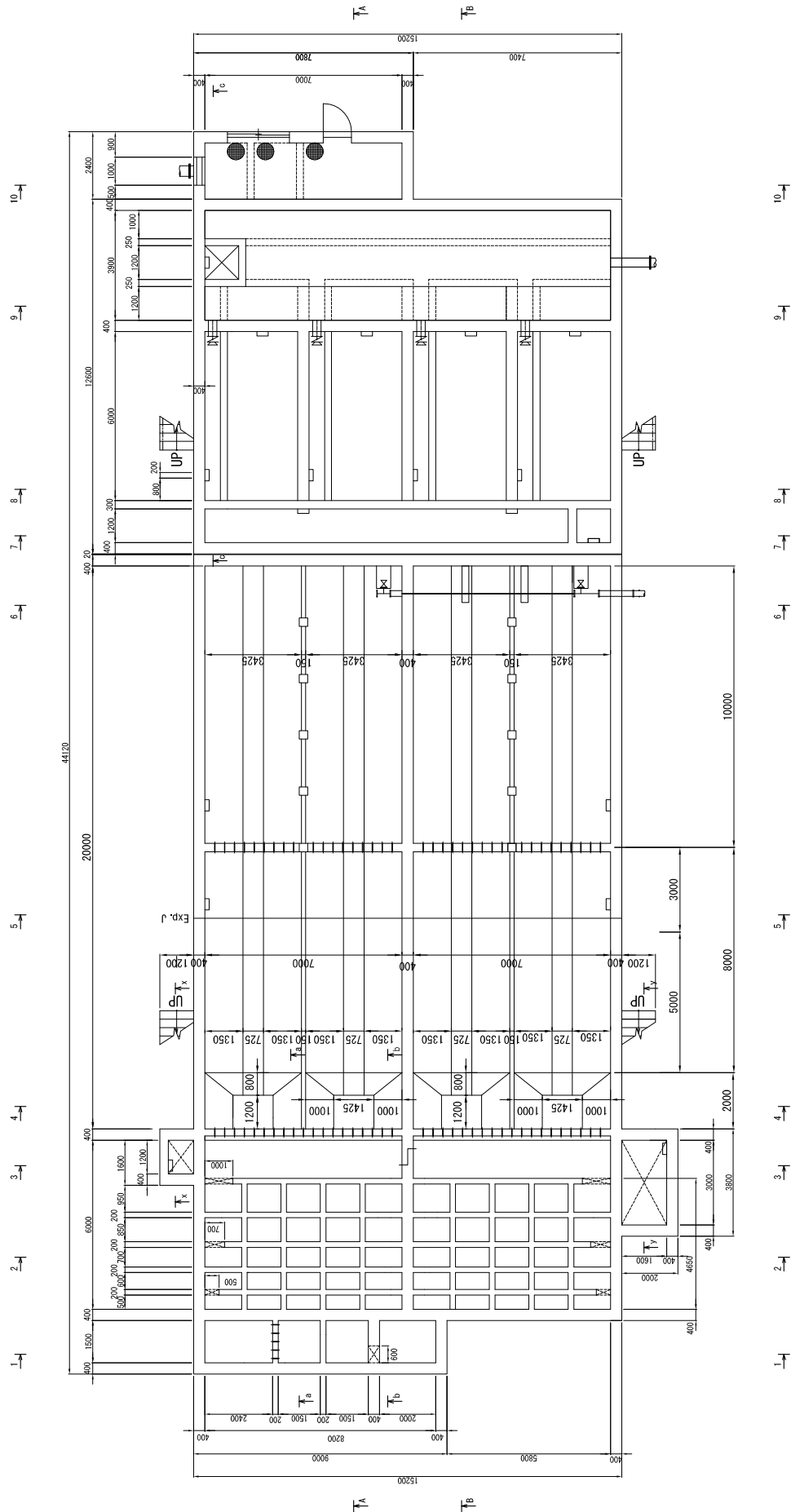
Recieving Well & Flocculation Basin

Sedimentation Basin

Filter Basin

Treatment Facilities PLAN1 (EL. 25.500)

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSANT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA		DESCRIPTION Water Treatment Facilities Structure (1)	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
	PREPARED BY	DATE			SCALE		
							PT-3 S-1:150 (A3)



Recieving Well & Flocculation Basin

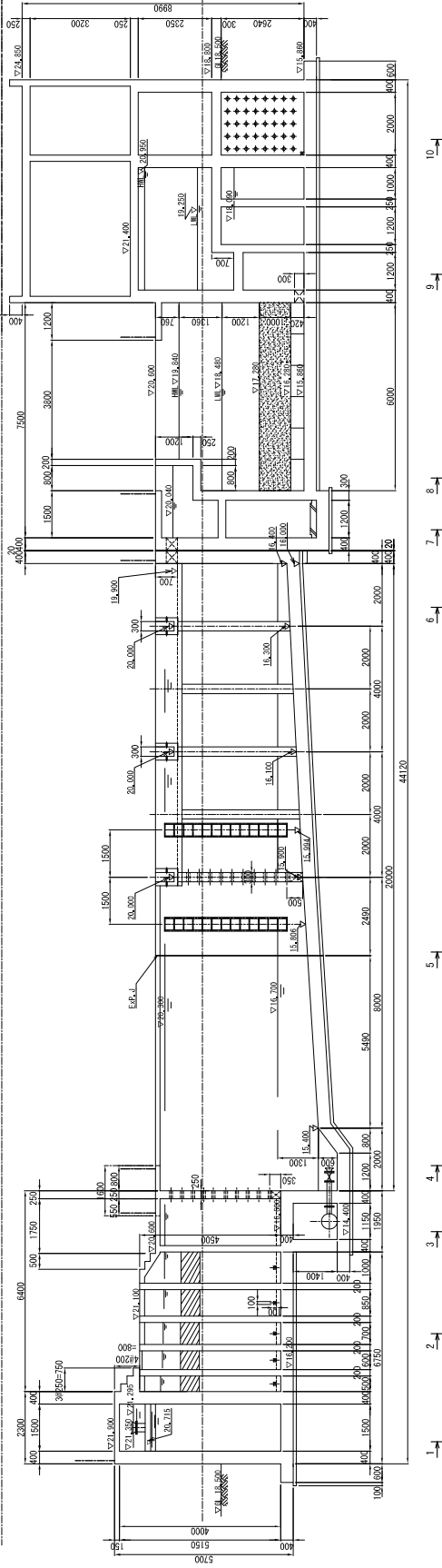
Sedimentation Basin

Filter Basin

Treatment Facilities PLAN2 (EL 19.100)

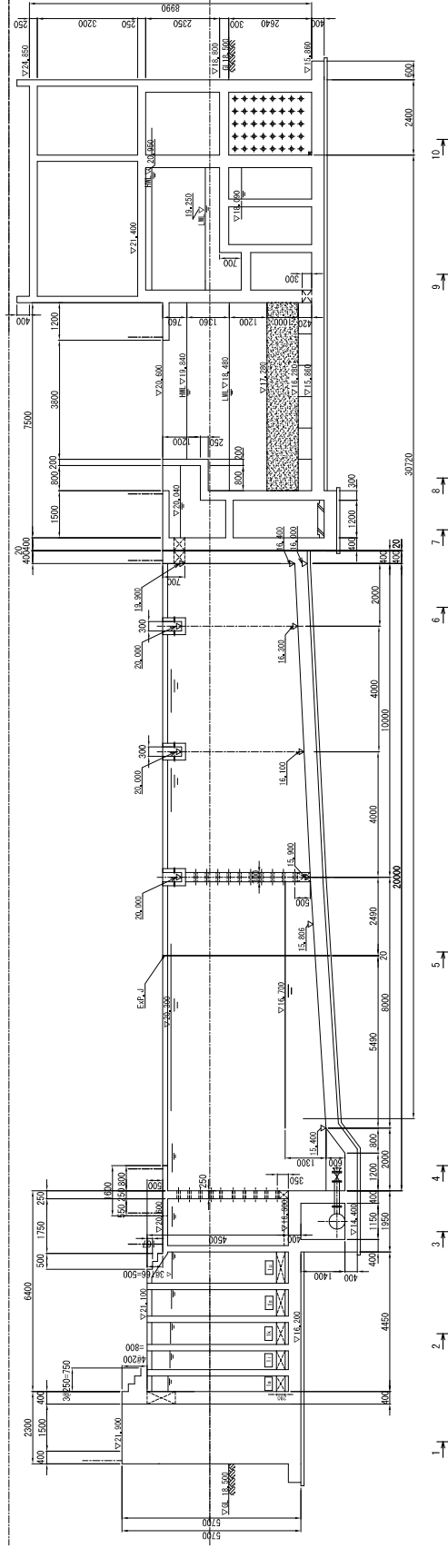
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA		DESCRIPTION Water Treatment Facilities Structure (2)	MINISTRY OF INDUSTRY AND HANDICRAFT CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	SCALE

PLAN1 (EL25.500)



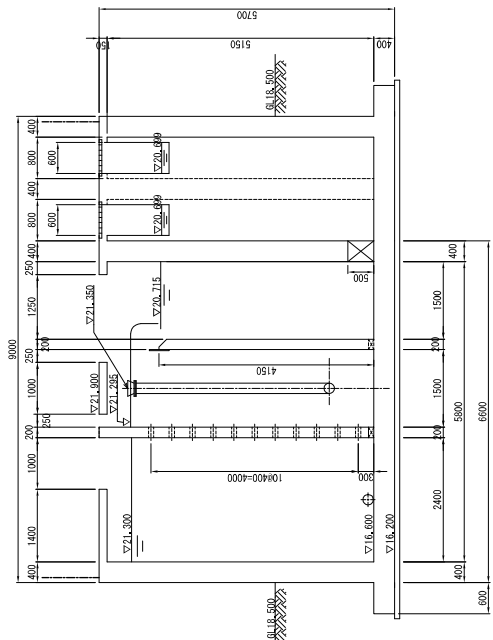
A-A Section

PLAN1 (EL25.500)

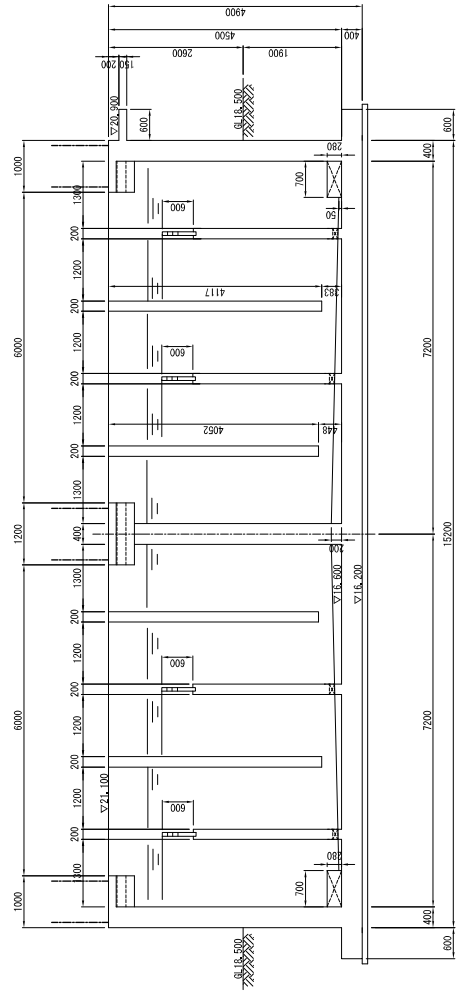


B-B Section

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSANT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	Water Treatment Facilities Structure (3)	MINISTRY OF INDUSTRY AND HANDICRAFT CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	SCALE
							PT-5 S=1:150 (A3)

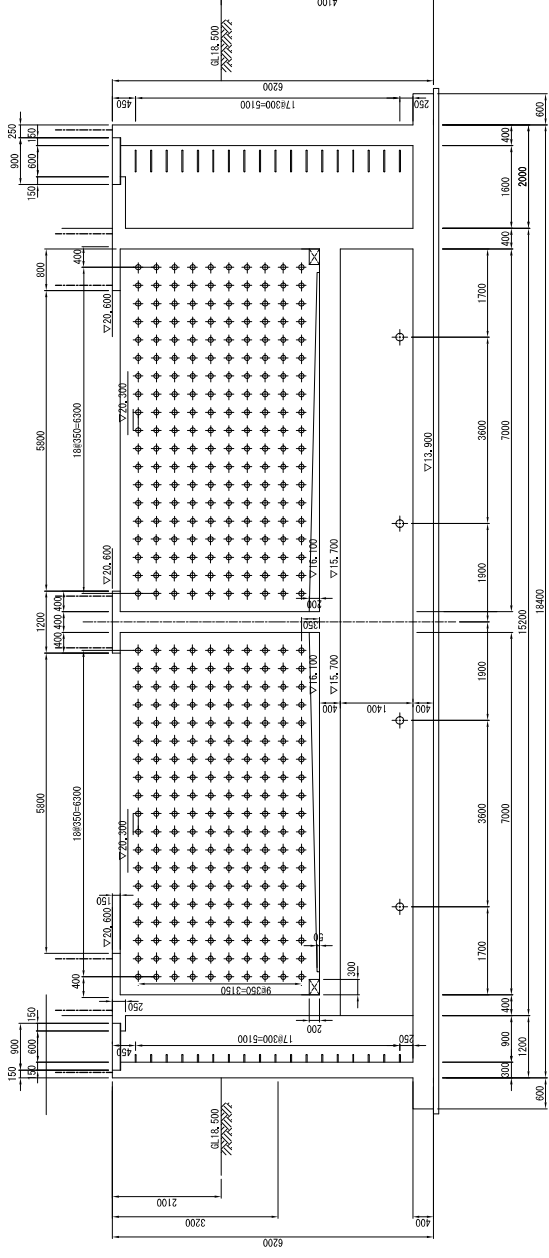


1-1 Section

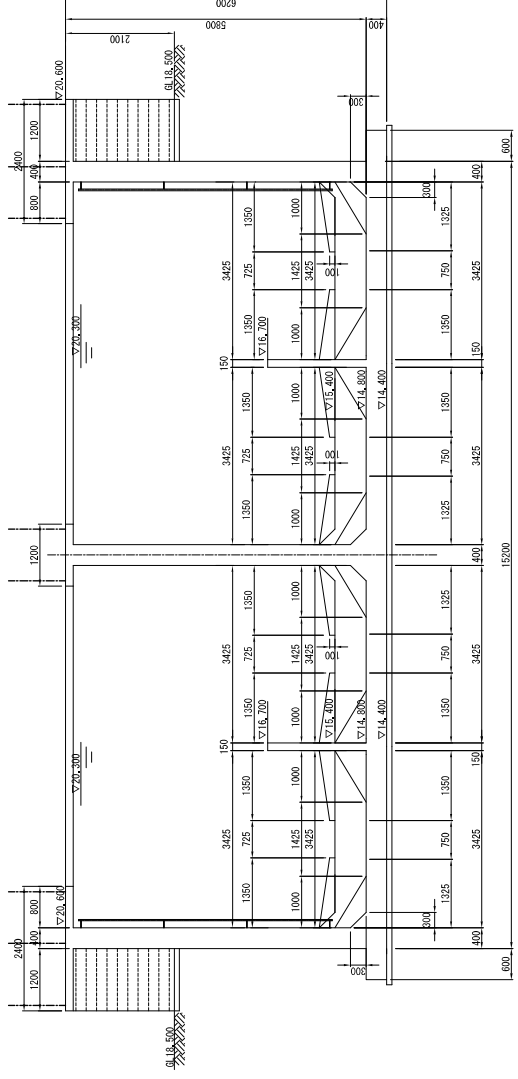


2-2 Section

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	Water Treatment Facilities Structure (5)	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	SCALE
							PT-7 S=1:100 (A3)



3-3 Section



4-4 Section

PROJECT
 PREPARATORY SURVEY ON THE PROJECT FOR
 EXPANSION OF WATER SUPPLY SYSTEM
 IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

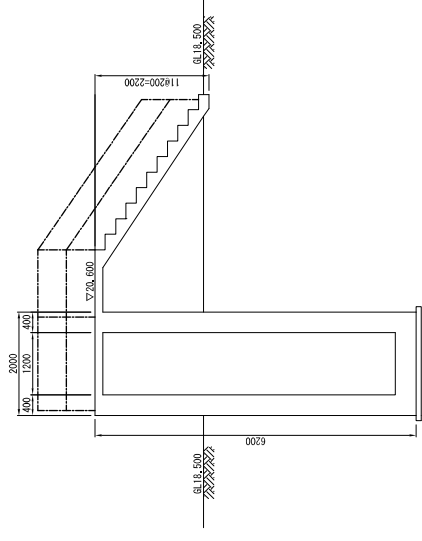
DESCRIPTION
 Water Treatment Facilities
 Structure (6)

MINISTRY OF INDUSTRY AND HANDICRAFT
 CTE ENGINEERING INTERNATIONAL CO., LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

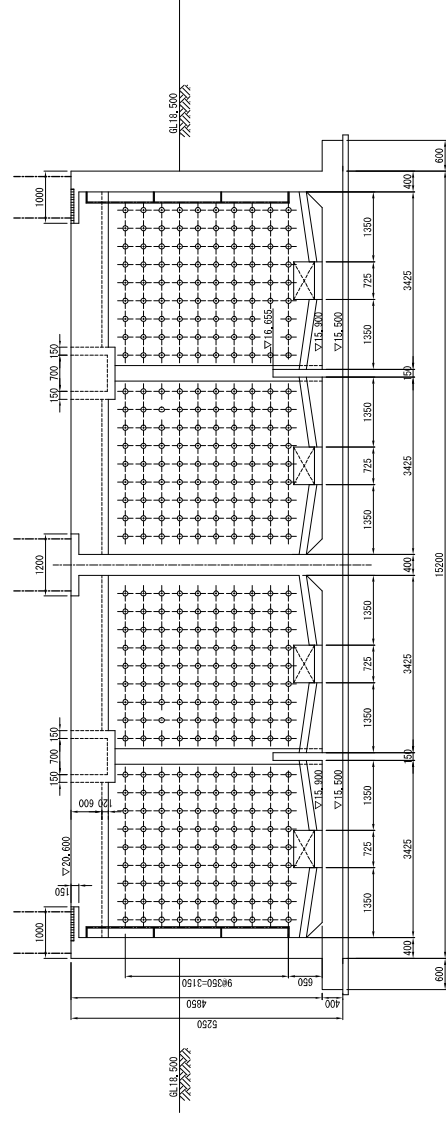
APPROVE BY
 PREPARED BY

DATE
 DATE

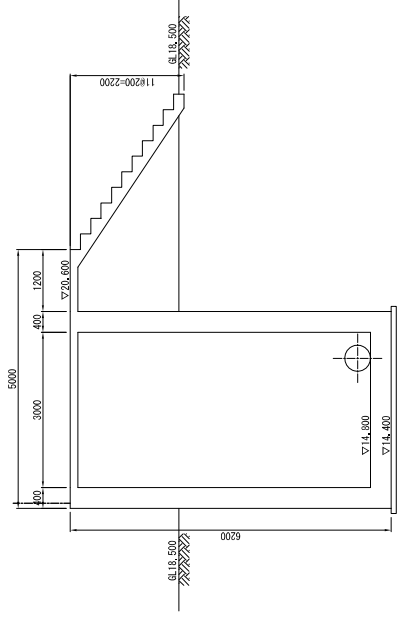
DRAWING No
 PT-8
 SCALE
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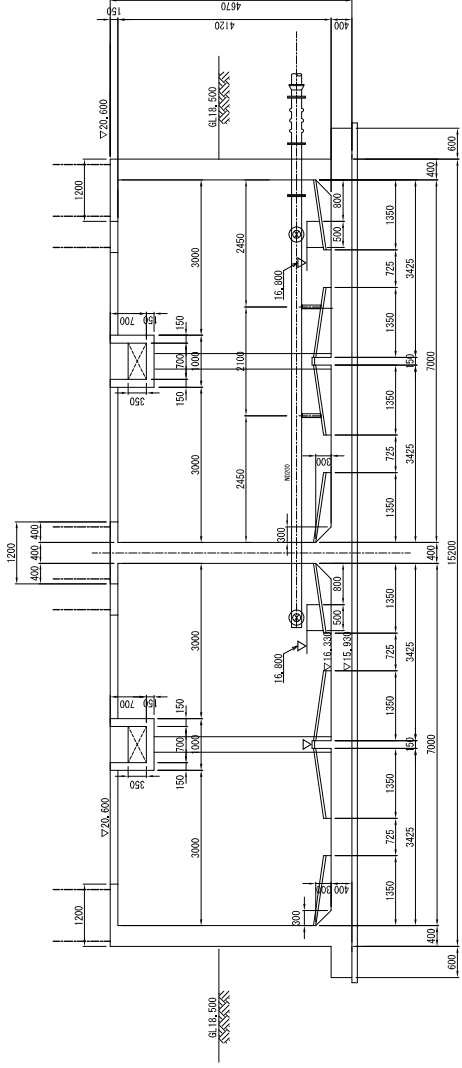
X-Y Section



5-5 Section

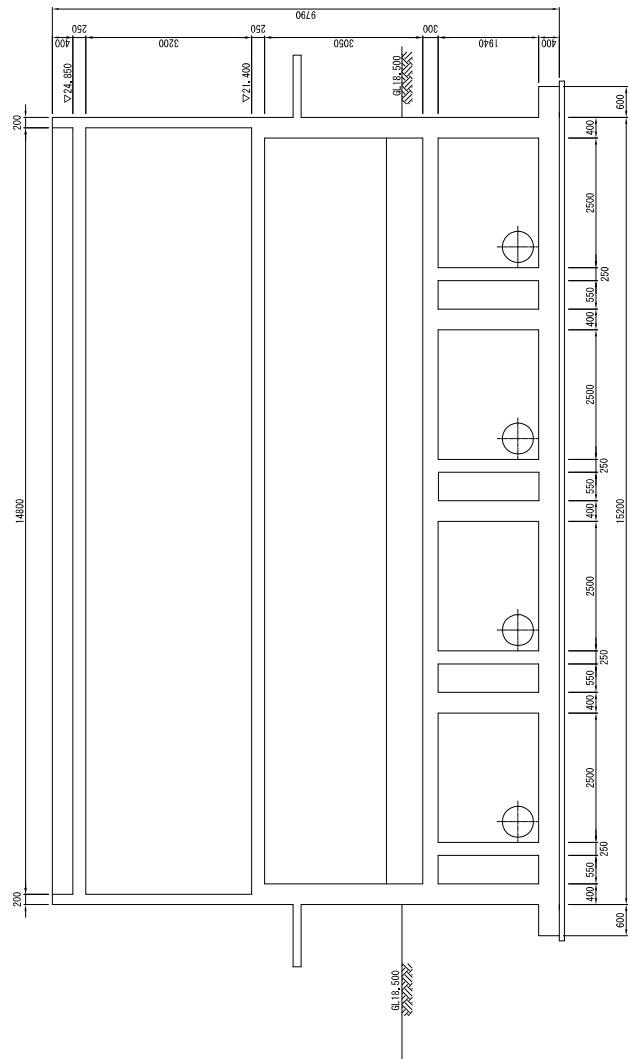


Y-Y Section

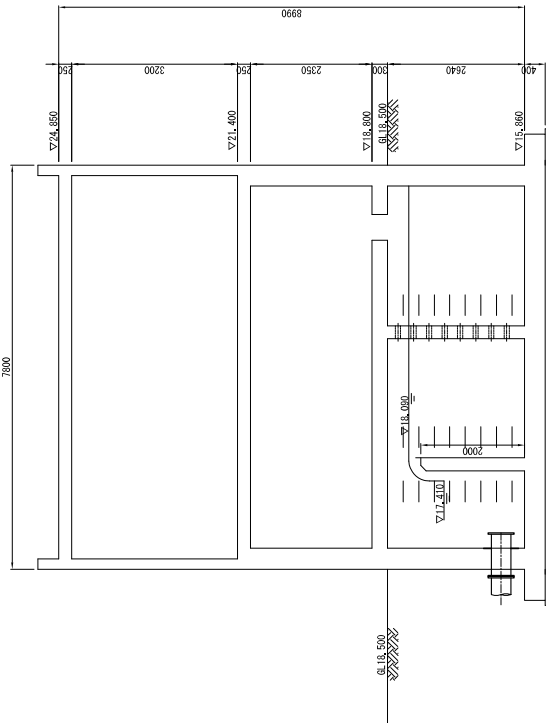


6-6 Section

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION Water Treatment Facilities Structure (7)	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
				PREPARED BY	DATE	SCALE S=1:100 (A3)

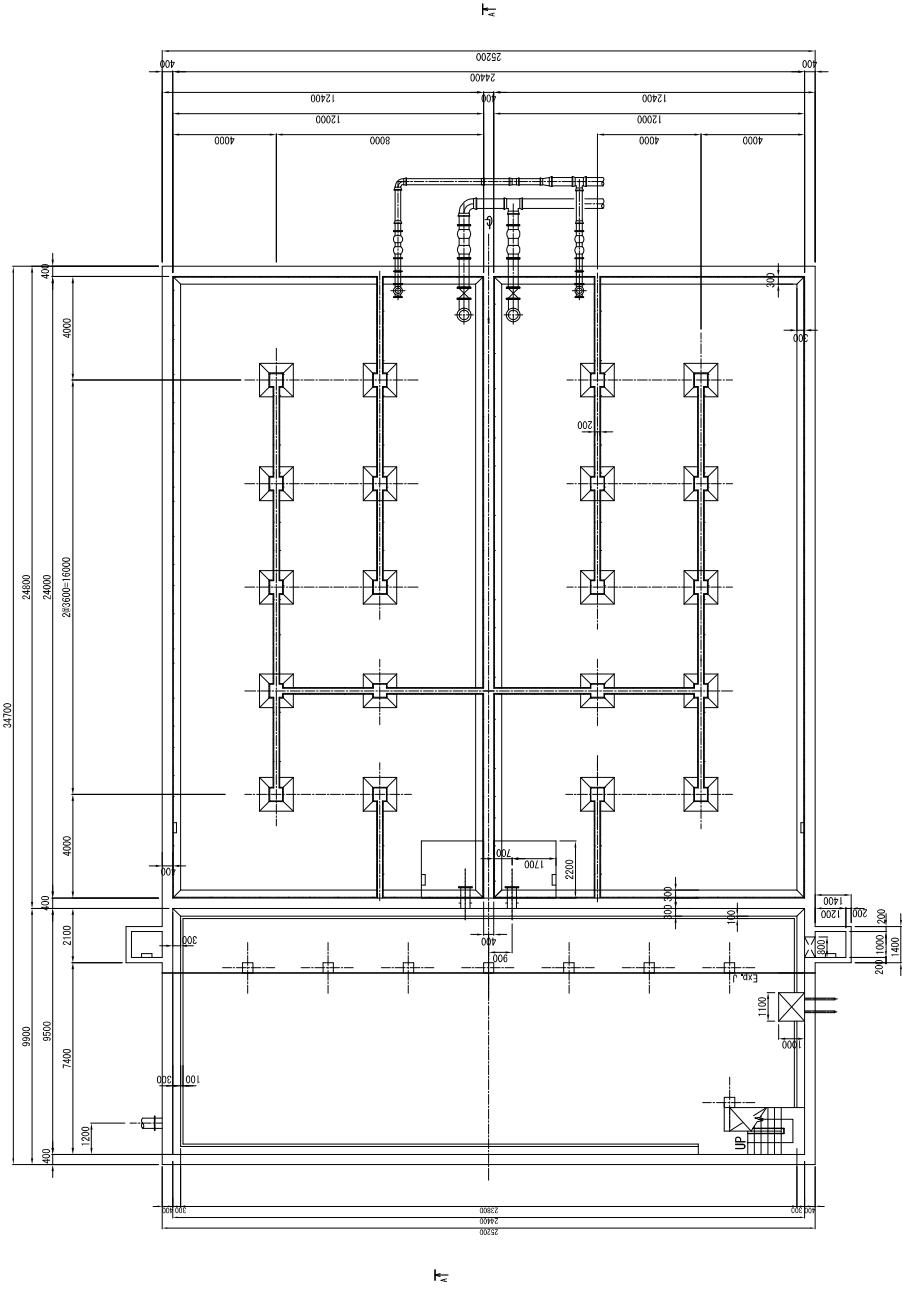


9-9 Section

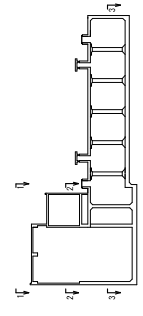


10-10 Section

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION Water Treatment Facilities Structure (9)	MINISTRY OF INDUSTRY AND HANDICRAFT CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
				PREPARED BY	DATE	SCALE
						PT-11 S=1:100 (A3)

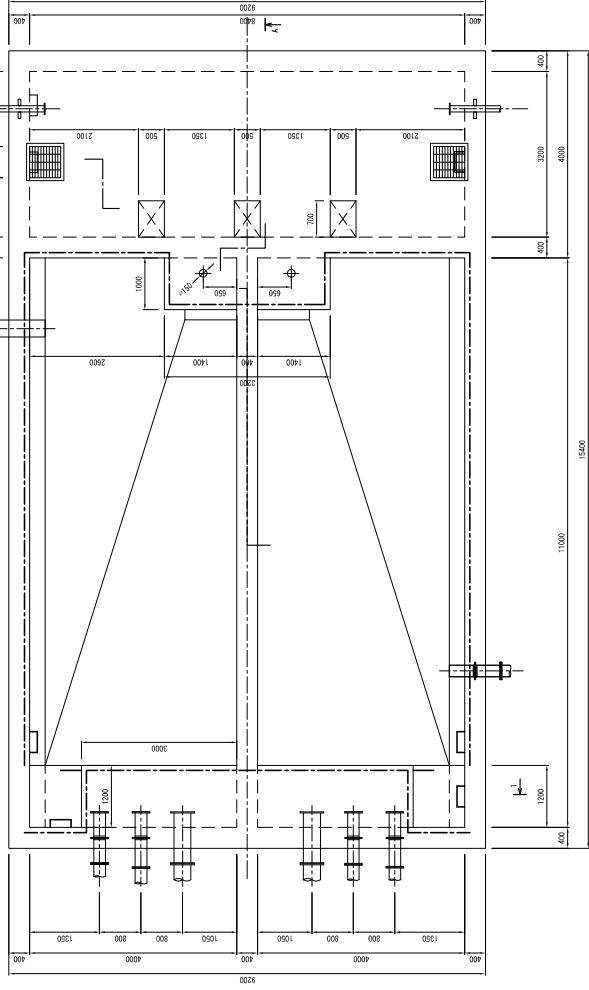


PLAN 2 (E114.000)

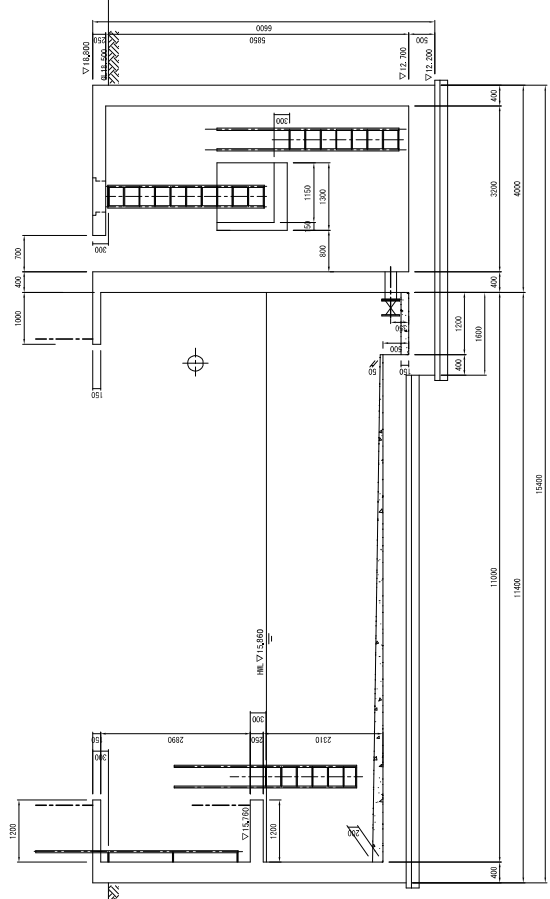


Key Plan

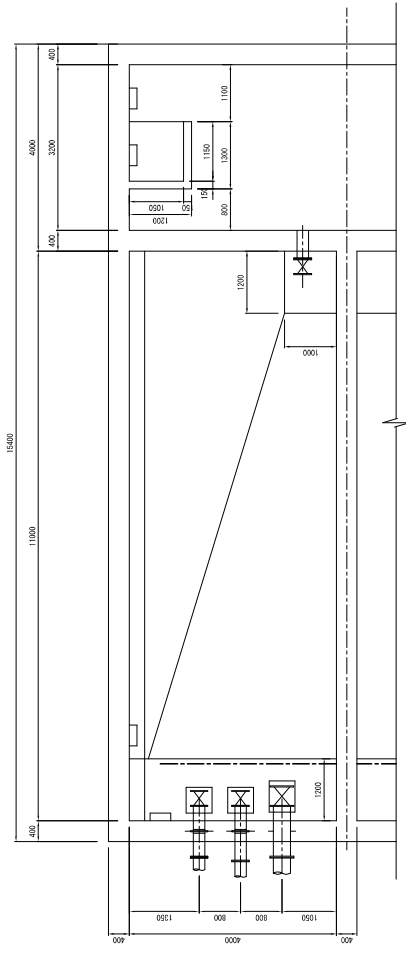
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	Service Reservoir and Pumping Station Structure (2)	MINISTRY OF INDUSTRY AND HANDICRAFT CIT ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	SCALE
							PT-13 S=1:200 (A3)



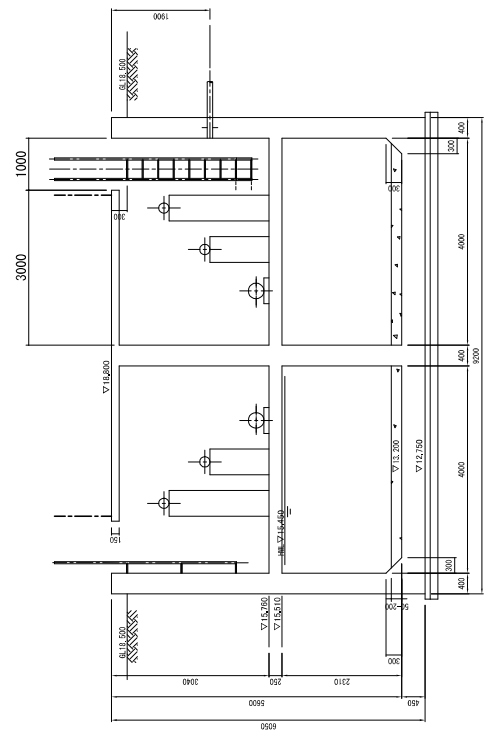
PLAN1 (19.000)



A-A Section

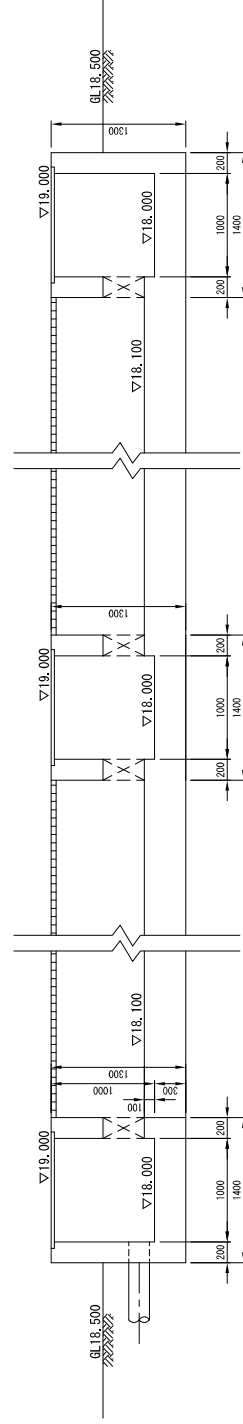
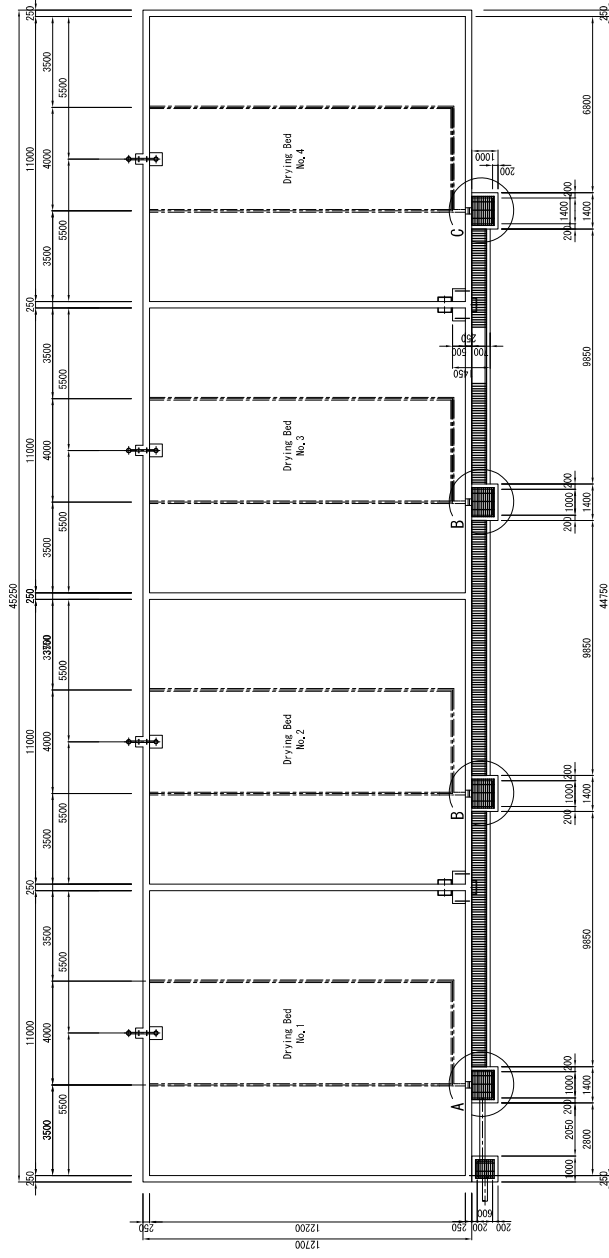


PLAN2 (17.000)



1-1 Section

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA		DESCRIPTION Drainage Basin Structure	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE S=1:100 (A3)

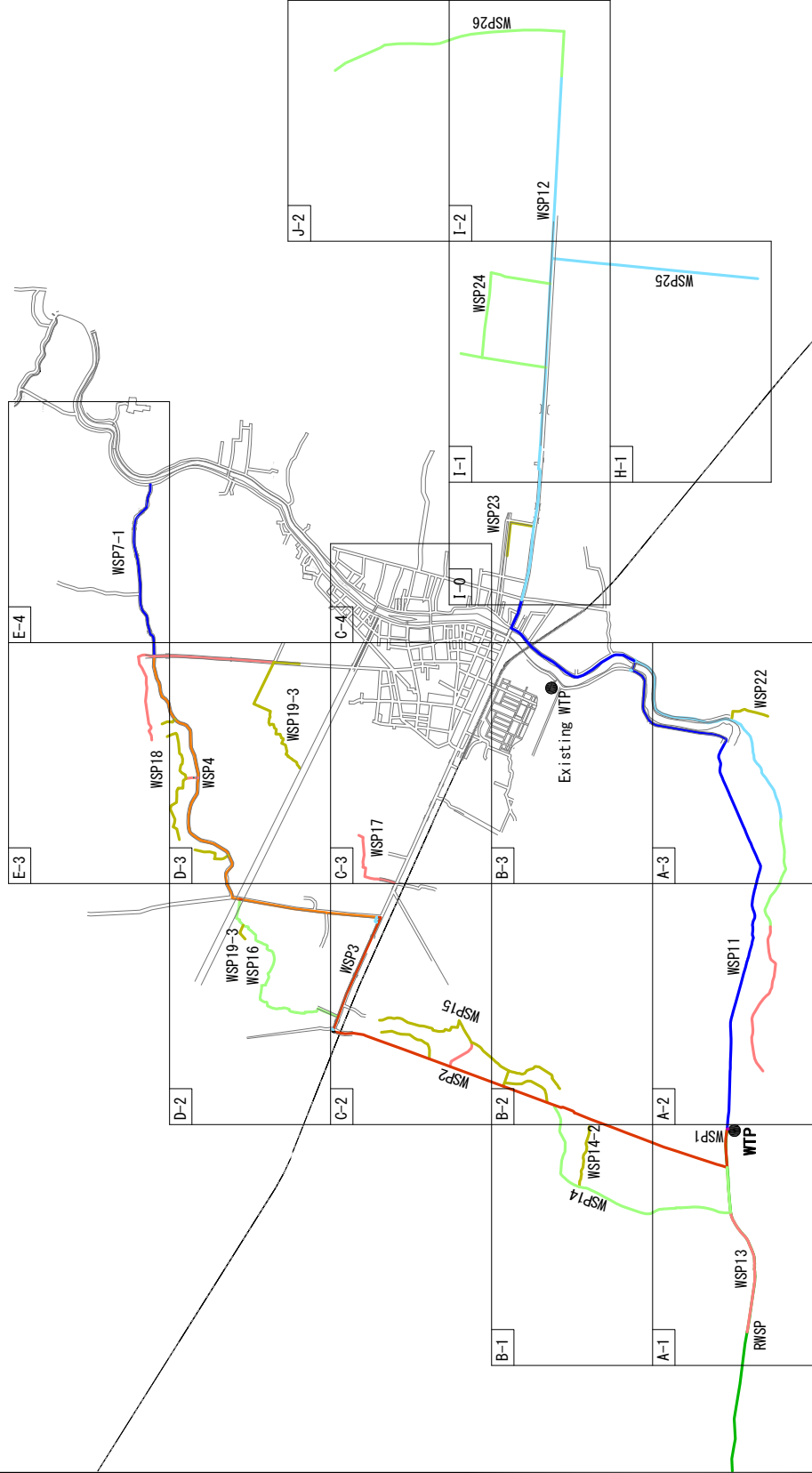


Detail A
Scale=1/50

Detail B
Scale=1/50

Detail C
Scale=1/50

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA		DESCRIPTION Drying Bed Structure	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
	PREPARED BY	DATE			SCALE		
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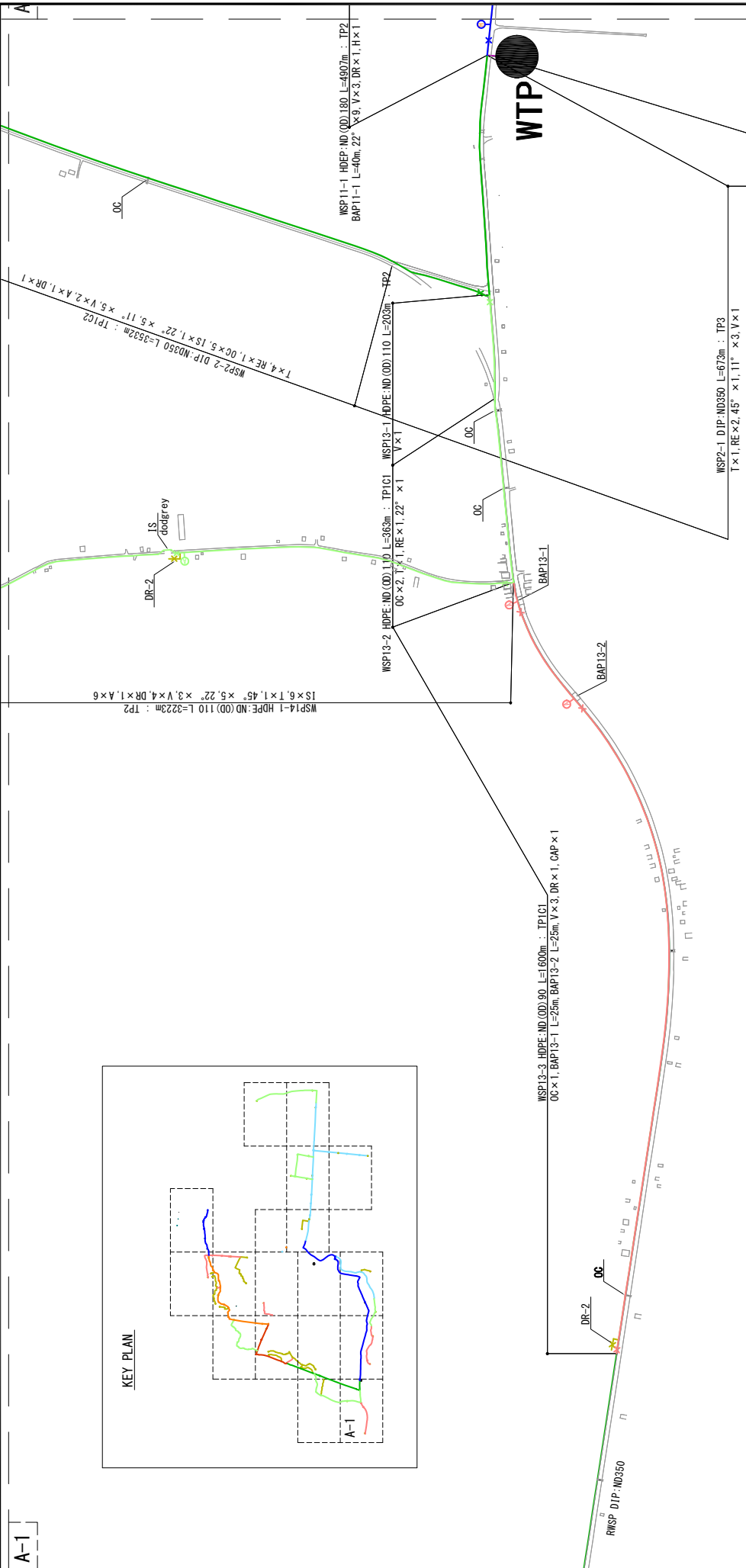
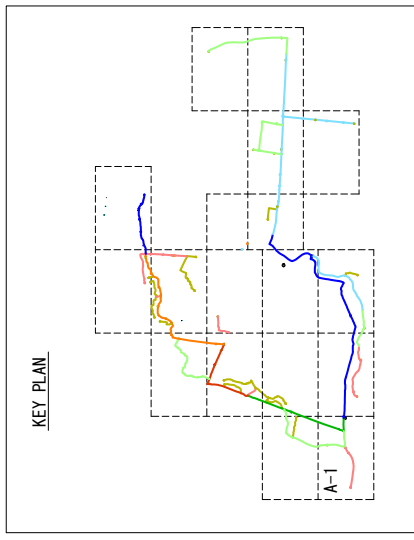


LEGEND
Type of Diameter

Black line	DIP: ND450
Purple line	DIP: ND400
Green line	DIP: ND350
Orange line	DIP: ND300
Red line	HDPE: NO (OD) 280
Blue line	HDPE: NO (OD) 225
Light blue line	HDPE: NO (OD) 180
Light green line	HDPE: NO (OD) 110
Yellow line	HDPE: NO (OD) 90
Light yellow line	HDPE: NO (OD) 63
Grey line	Existing Pipe

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	General Map for Distribution Pipeline Network	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	PD-1
							SCALE
							1: 60, 000

A-1



DRAWING No **PD-2**

SCALE **1:8,000**

DATE

APPROVE BY

MINISTRY OF INDUSTRY AND HANDICRAFT

CIT ENGINEERING INTERNATIONAL CO., LTD.

WATER AND SEWER BUREAU CITY OF KITAKYUSHU

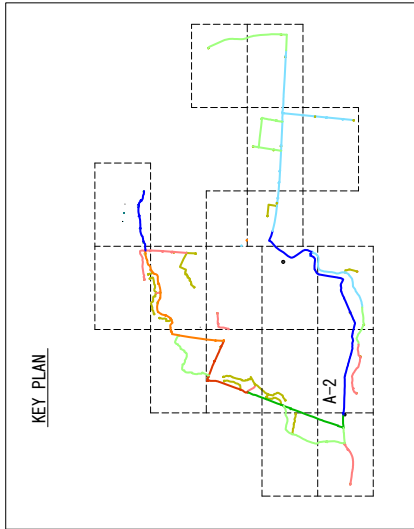
TEC INTERNATIONAL CO., LTD.

DESCRIPTION

Distribution Pipeline Plan(A-1)

PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT

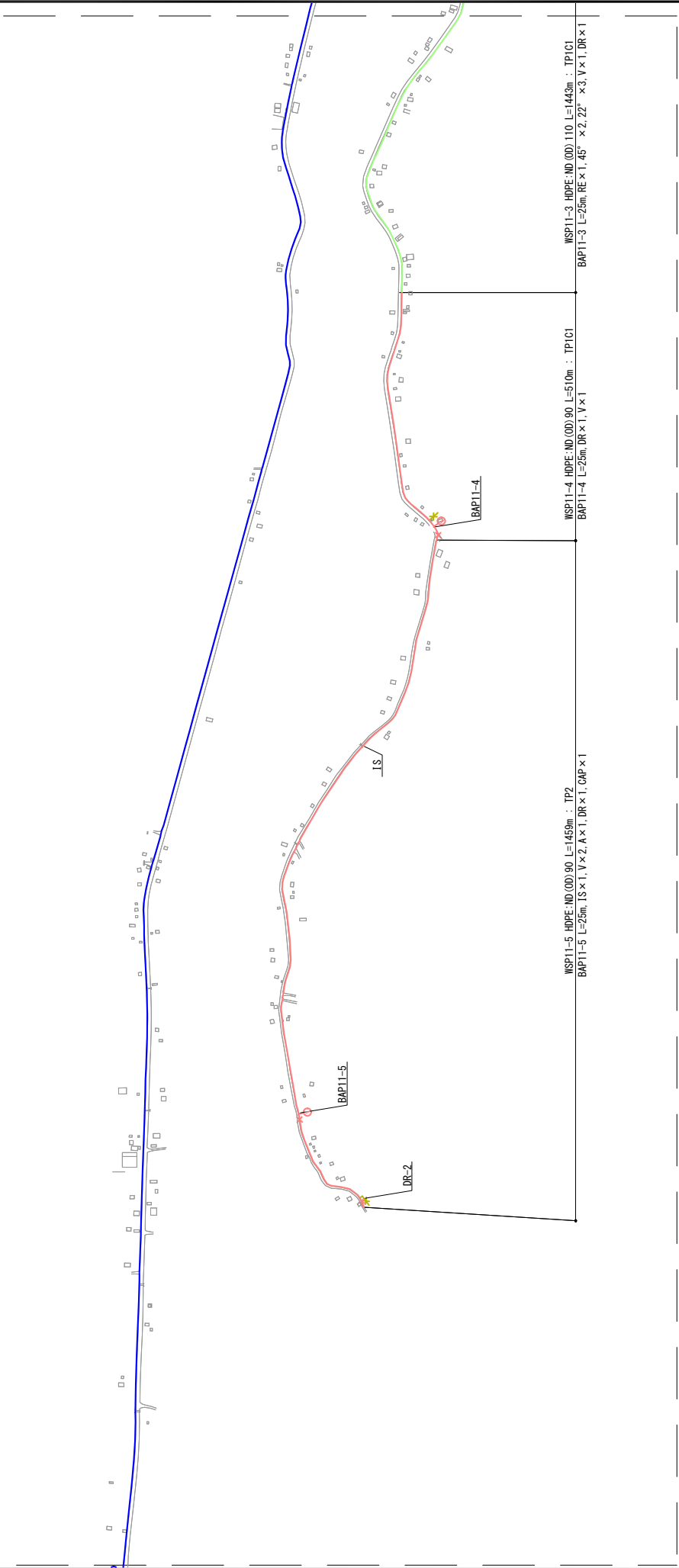
PROJECT



LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation
①N Asphalt National Road h=1.20m	DIP: ND450	IS Inverted Siphon
①C-1 Asphalt City Road h=0.80m	DIP: ND400	OC Over Cross
①C-2 Asphalt City Road h=1.00m	DIP: ND350	ISR Inverted siphon Rail way
② Road Shoulder h=0.80m	DIP: ND300	BAP Br idge-attached Pipe
③ Road Shoulder h=1.00m	HDPE: ND (OD) 280	PB Pipe Beam
④ Concrete h=0.80m	HDPE: ND (OD) 225	DR Drain Pipe
	HDPE: ND (OD) 180	RE Reducer
	HDPE: ND (OD) 110	T Tee
	HDPE: ND (OD) 63	ISN Inverted siphon National Road
	Existing Pipe	TP Type of Pavement
		CF Connecting Fittings
		V Valve
		A Air Valve
		H Fire Hydrant
		M Meter

WSP11-1 HDPE: ND (OD) 225 L=490m : TP2
 BAP11-1 L=40m, 22" x 9, V x 2, DR x 1, H x 1



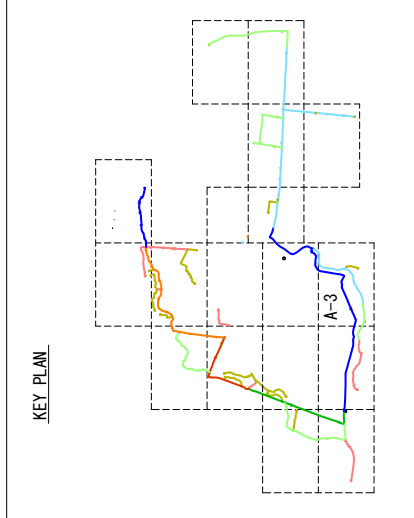
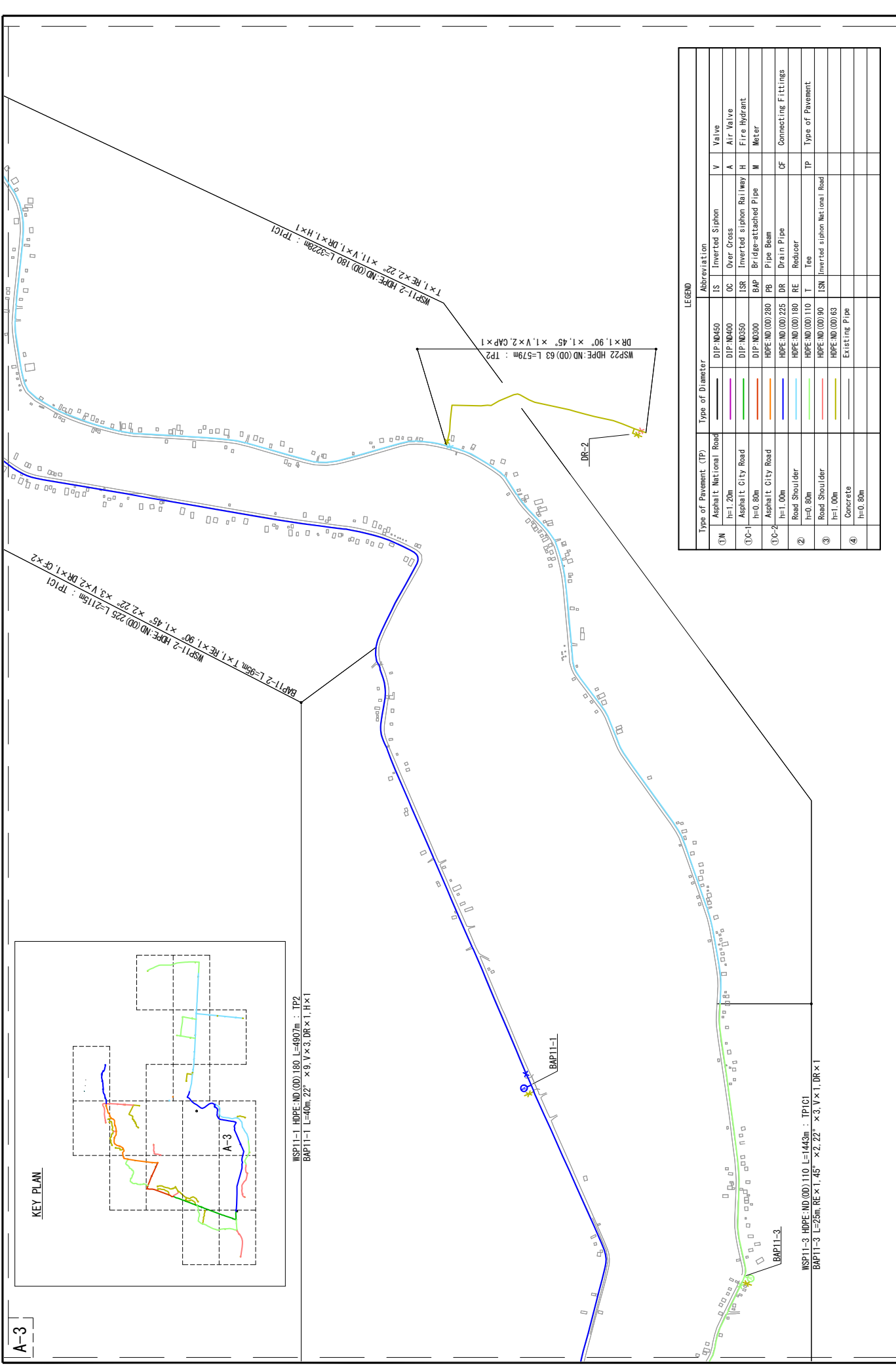
WSP11-2 HDPE: ND (OD) 110 L=1459m : TP1C1
 BAP11-2 L=25m, IS x 1, V x 2, A x 1, DR x 1, CAP x 1

WSP11-3 HDPE: ND (OD) 110 L=1443m : TP1C1
 BAP11-3 L=25m, RE x 1, 45" x 2, 22" x 3, V x 1, DR x 1

WSP11-4 HDPE: ND (OD) 90 L=510m : TP1C1
 BAP11-4 L=25m, DR x 1, V x 1

WSP11-5 HDPE: ND (OD) 90 L=1459m : TP2
 BAP11-5 L=25m, IS x 1, V x 2, A x 1, DR x 1, CAP x 1

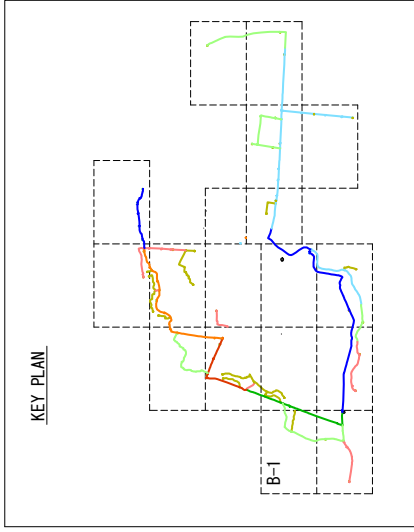
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION Distribution Pipeline Plan(A-2)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
			CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
						PD-3 1:8,000



LEGEND

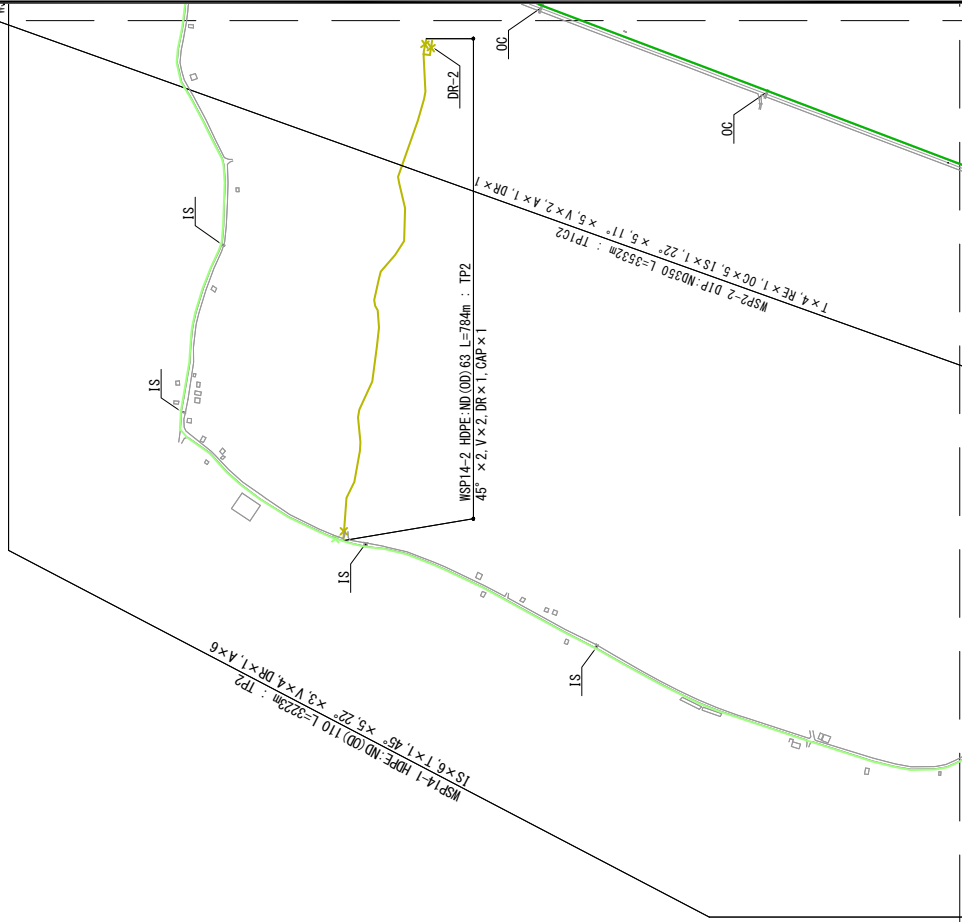
Type of Pavement (TP)	Type of Diameter	Abbreviation	
Asphalt, National Road	DIP: ND450	IS	Inverted Siphon
h=1.20m	DIP: ND400	OC	Over Cross
Asphalt, City Road	DIP: ND550	ISR	Inverted siphon Railway
h=0.80m	DIP: ND300	BAP	Bridge-attached Pipe
Asphalt, City Road	HDPE: ND (OD) 230	PB	Pipe Beam
h=1.00m	HDPE: ND (OD) 225	DR	Drain Pipe
Road Shoulder	HDPE: ND (OD) 180	RE	Reducer
h=0.80m	HDPE: ND (OD) 110	T	Teo
Road Shoulder	HDPE: ND (OD) 90	ISN	Inverted siphon National Road
h=1.00m	HDPE: ND (OD) 63		
Concrete	Existing Pipe		
h=0.80m			

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(A-3)	APPROVE BY	DATE	DRAWING No
					PD-4	
			MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
						1:8,000

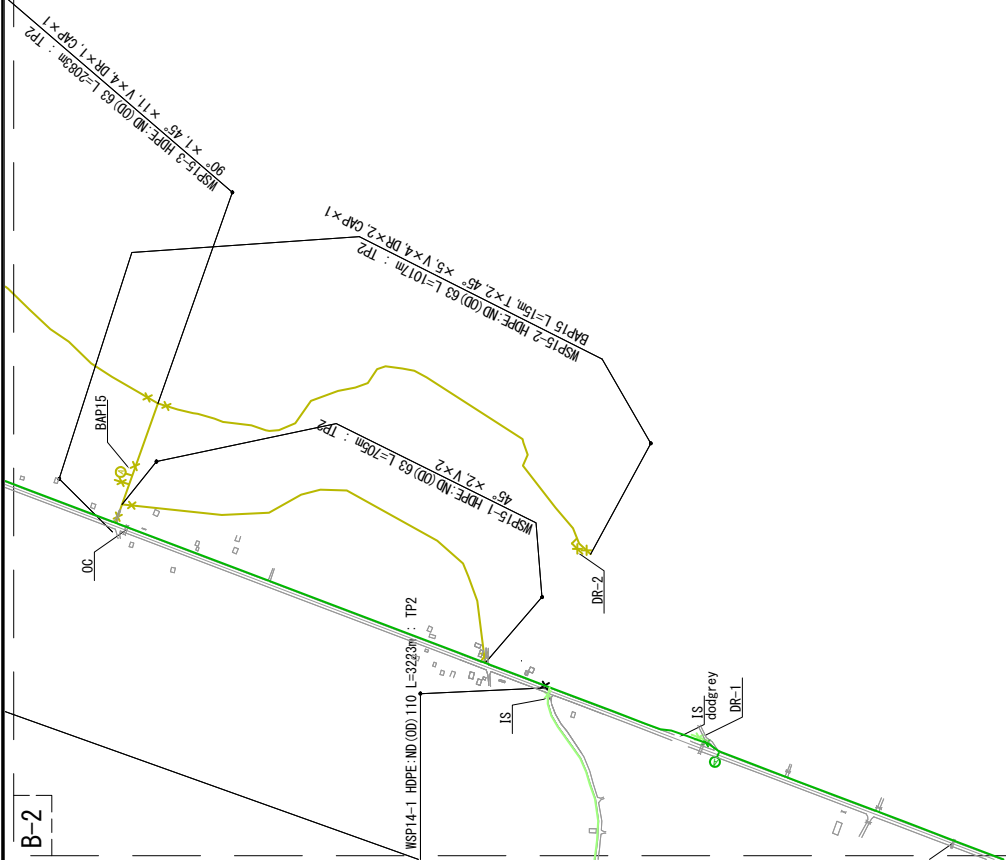


LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	V	Valve
①N Asphalt National Road h=1.20m	DIP: ND450	IS Inverted Siphon	V	Valve
①C-1 Asphalt City Road h=0.80m	DIP: ND400	OC Over Cross	A	Air Valve
①C-2 Asphalt City Road h=1.00m	DIP: ND350	ISR Inverted siphon Railway	H	Fire Hydrant
② Road Shoulder h=0.80m	DIP: ND300	BAP Bridge-attached Pipe	M	Meter
③ Road Shoulder h=1.00m	HDPE: ND (OD) 280	PB Pipe Beam	CF	Connecting Fittings
④ Concrete h=0.80m	HDPE: ND (OD) 225	DR Drain Pipe	TP	Type of Pavement
	HDPE: ND (OD) 180	RE Reducer		
	HDPE: ND (OD) 110	T Tee		
	HDPE: ND (OD) 90	ISN Inverted siphon National Road		
	HDPE: ND (OD) 63			
	Existing Pipe			

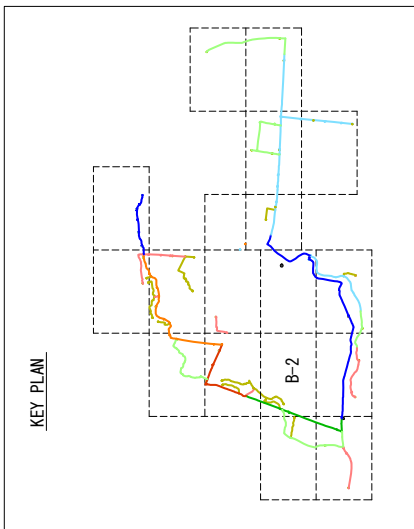


PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION Distribution Pipeline Plan(0-1)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No PD-5
			CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE 1:8,000



LEGEND

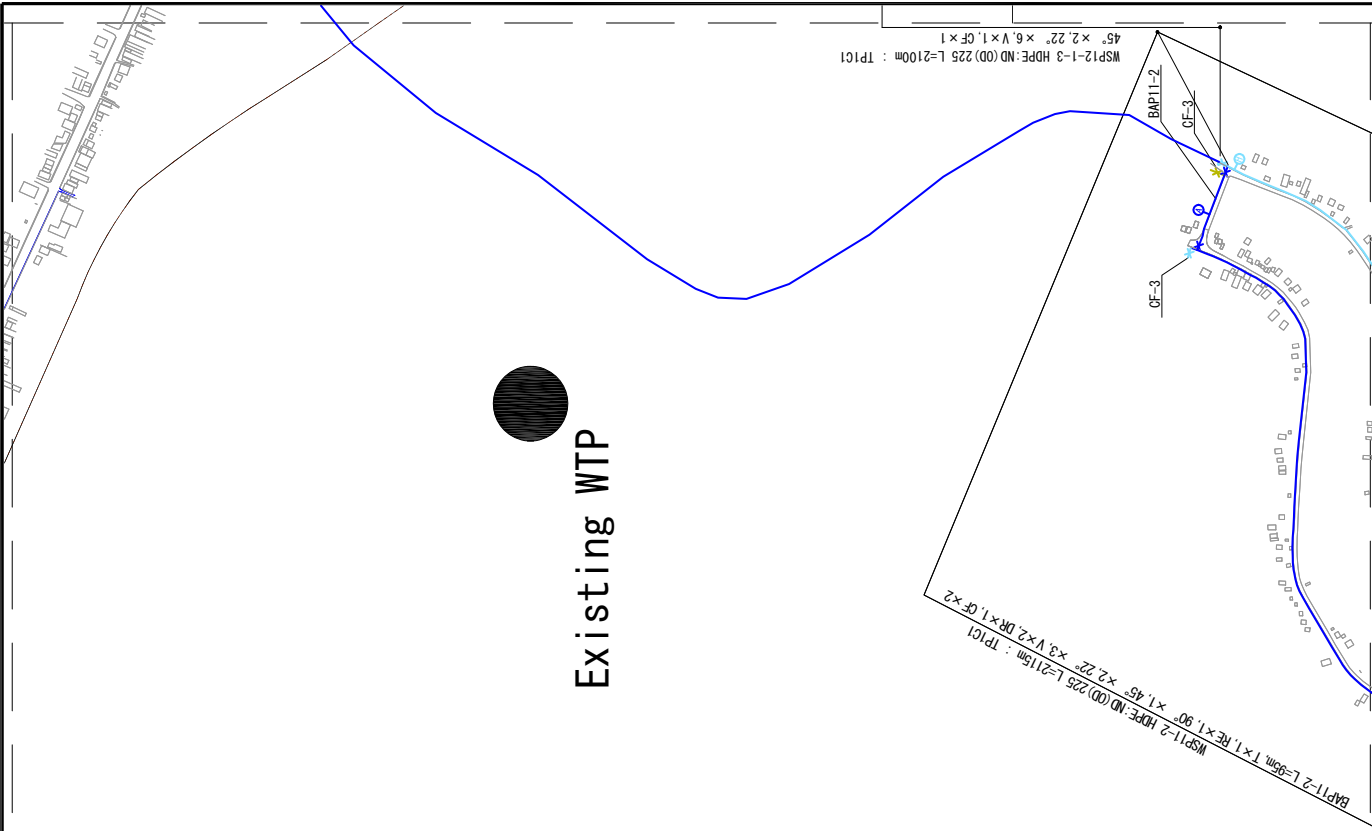
Type of Pavement (TP)	Type of Diameter	Abbreviation	V
0/N Asphalt National Road	DIP:ND450	IS Inverted Siphon	V Valve
	h=1.20m	OC Over Cross	A Air Valve
0/C-1 Asphalt City Road	DIP:ND350	ISR Inverted siphon Rail way	H Fire Hydrant
	h=0.80m	BAP Bridge-attached Pipe	M Meter
0/C-2 Asphalt City Road	HDPE-ND (OD) 280	PB Pipe Beam	CF Connecting Fittings
	h=1.00m	DR Drain Pipe	TP Type of Pavement
② Road Shoulder	HDPE-ND (OD) 180	RE Reducer	
	h=0.80m	HDPE-ND (OD) 110	T Tee
③ Road Shoulder	HDPE-ND (OD) 90	ISN Inverted siphon National Road	
	h=1.00m	Existing Pipe	
④ Concrete			
	h=0.80m		



B-2

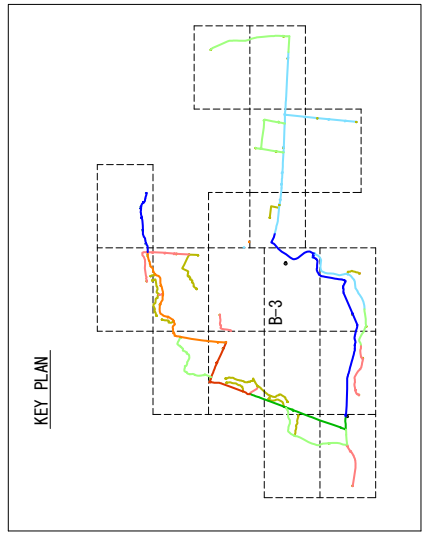
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(B-2)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	PP-6
						SCALE	
						1:8,000	

Existing WTP

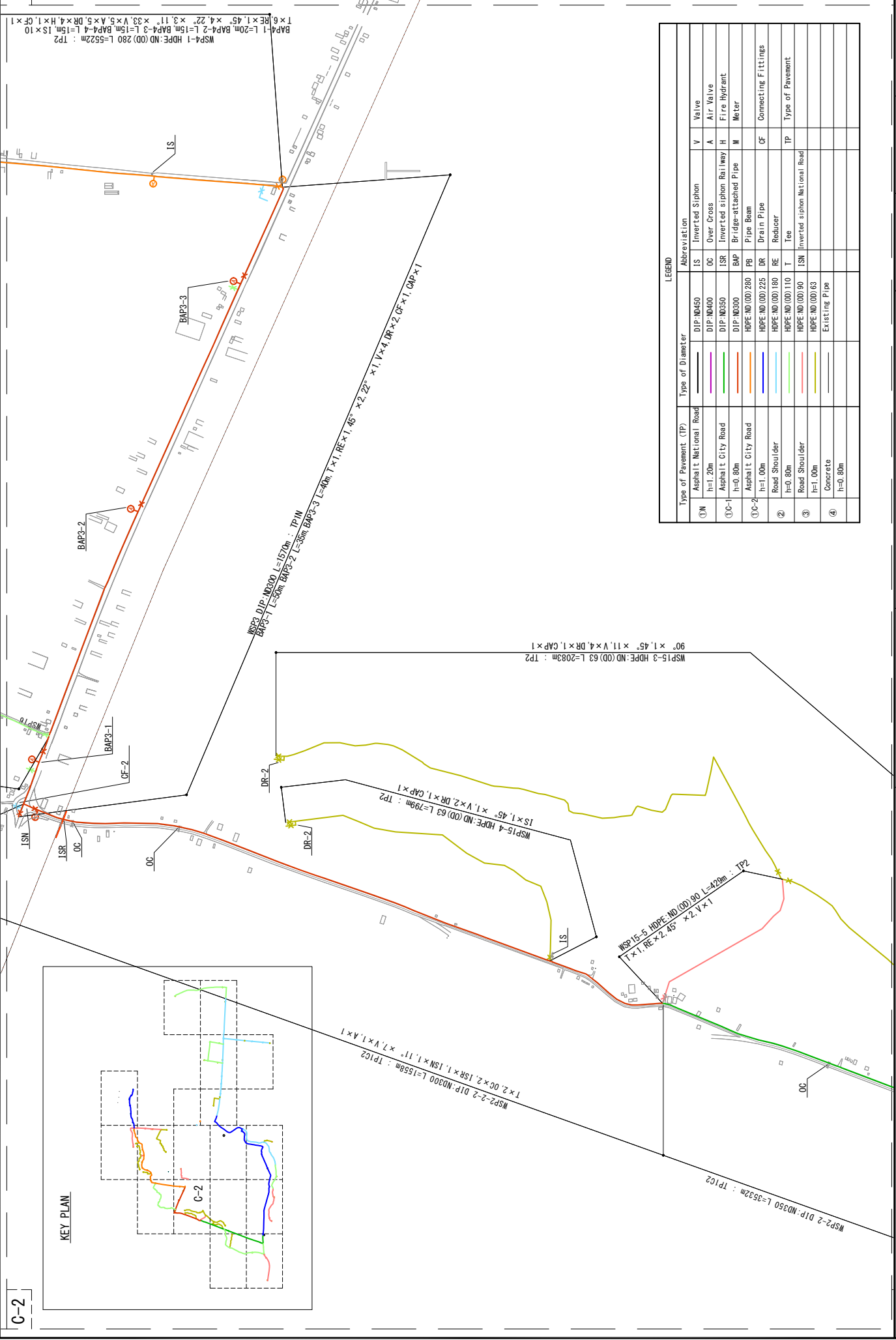


LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation
①N Asphalt National Road h=1.20m	DIP:ND450	IS Inverted Siphon
①O-1 Asphalt City Road h=0.80m	DIP:ND400	OC Over Cross
①O-2 Asphalt City Road h=1.00m	DIP:NB550	ISR Inverted siphon Railway
② Road Shoulder h=0.80m	DIP:NB000	BAP Bridge-attached Pipe
③ Road Shoulder h=1.00m	HDPE:ND(OD)200	PB Pipe Beam
④ Concrete h=0.80m	HDPE:ND(OD)225	DR Drain Pipe
	HDPE:ND(OD)110	RE Reducer
	HDPE:ND(OD)90	T Tee
	Existing Pipe	ISM Inverted siphon National Road
		V Valve
		A Air Valve
		H Fire Hydrant
		M Meter
		CF Connecting Fittings
		TP Type of Pavement



PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(B-3)
MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
CTI ENGINEERING INTERNATIONAL CO., LTD.	PREPARED BY	DATE	PD-7
WATER AND SEWER BUREAU CITY OF KITAKYUSHU			SCALE
TEC INTERNATIONAL CO., LTD.			1:8,000



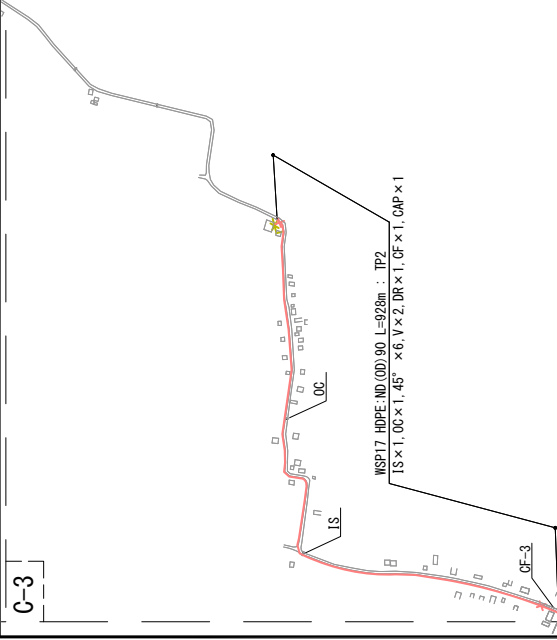
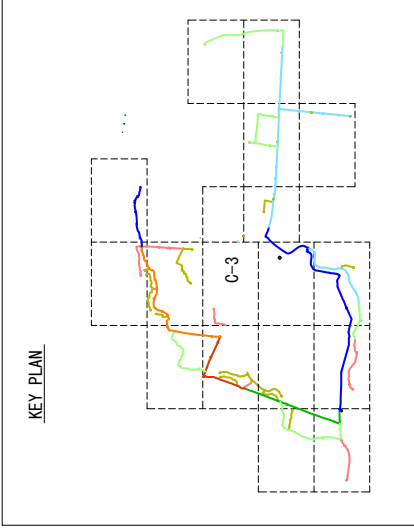
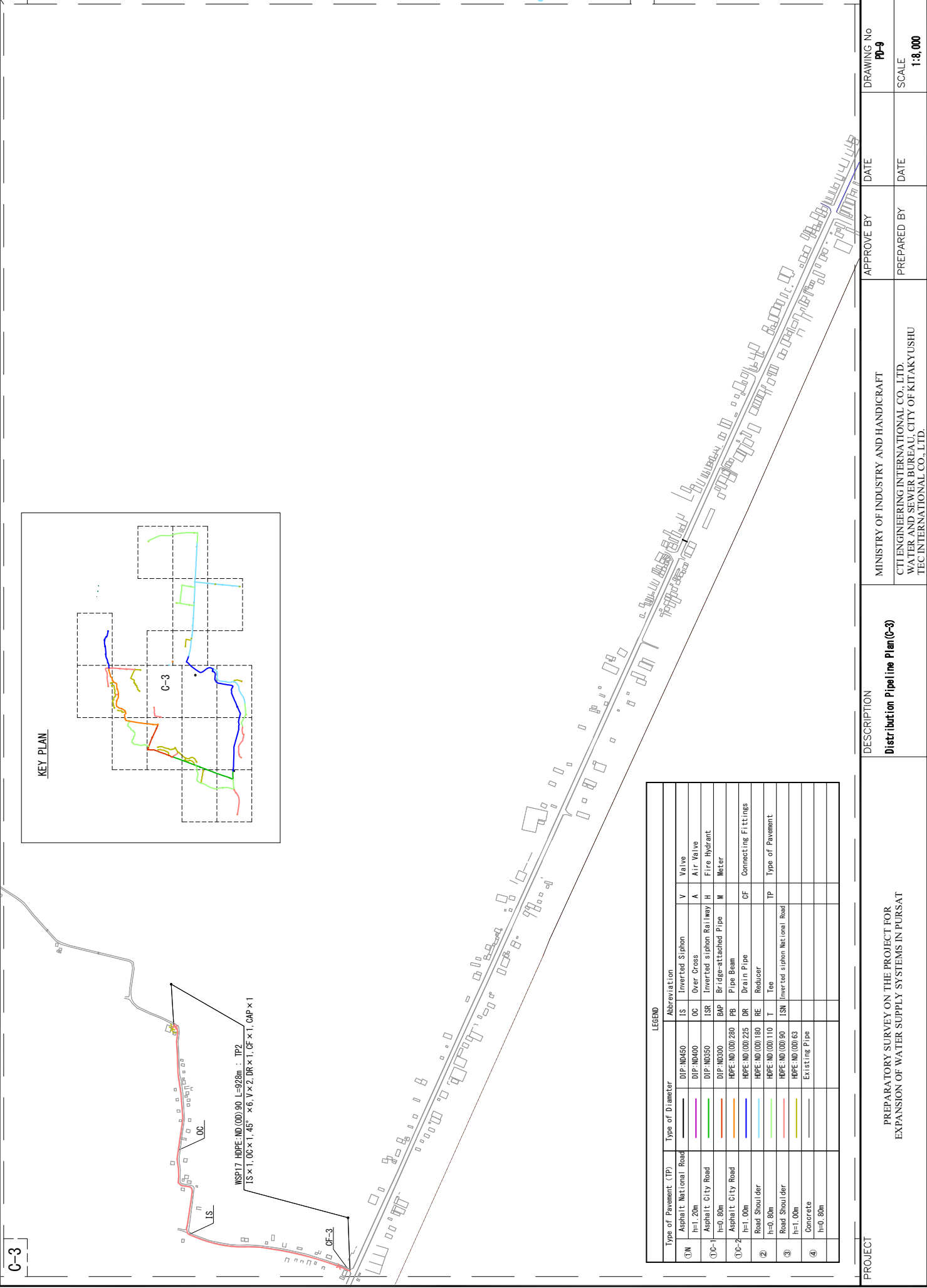
C-2

KEY PLAN

LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	Valve
①N Asphalt National Road	DIP: MD450	IS Inverted Siphon	V Valve
h=1.20m	DIP: MD400	OC Over Cross	A Air Valve
Asphalt City Road	DIP: MD350	ISR Inverted siphon Railway	H Fire Hydrant
h=0.80m	DIP: MD300	BAP Bridge-attached Pipe	M Meter
①④-1 Asphalt City Road	HDPE: ND (OD) 280	PR Pipe Beam	
h=1.00m	HDPE: ND (OD) 225	DR Drain Pipe	CF Connecting Fittings
Road Shoulder	HDPE: ND (OD) 180	RE Reducer	
h=0.80m	HDPE: ND (OD) 110	T Tee	TP Type of Pavement
③ Road Shoulder	HDPE: ND (OD) 90	ISN Inverted siphon National Road	
h=1.00m	HDPE: ND (OD) 63		
Concrete	Existing Pipe		
h=0.80m			

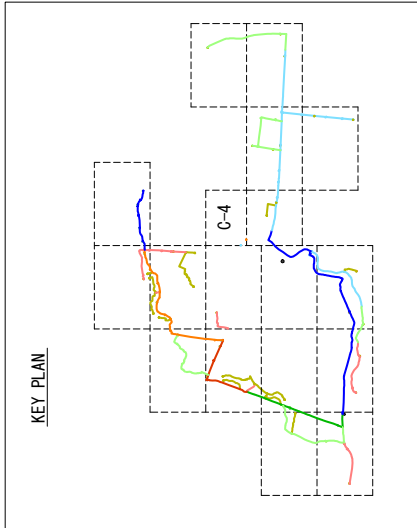
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT		APPROVE BY	DATE	DRAWING NO
	DESCRIPTION		Distribution Pipeline Plan (C-2)		PD-8
MINISTRY OF INDUSTRY AND HANDICRAFT		PREPARED BY		DATE	SCALE
CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU		TEC INTERNATIONAL CO., LTD.			1:8,000



LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	V
①M Asphalt National Road	DIP: ND450	IS Inverted Siphon	V Valve
h=1.20m	DIP: ND400	OC Over Cross	A Air Valve
Asphalt City Road	DIP: ND350	ISR Inverted siphon Railway	H Fire Hydrant
h=0.80m	DIP: ND300	BAP Bridge-attached Pipe	M Meter
Asphalt City Road	HDPE-ND (00) 200	PB Pipe Beam	
h=1.00m	HDPE-ND (00) 225	DR Drain Pipe	CF Connecting Fittings
Road Shoulder	HDPE-ND (00) 180	RE Reducer	
h=0.80m	HDPE-ND (00) 110	T Tee	TP Type of Pavement
Road Shoulder	HDPE-ND (00) 90	ISN Inverted siphon National Road	
Concrete	HDPE-ND (00) 63	Existing Pipe	
h=0.80m			

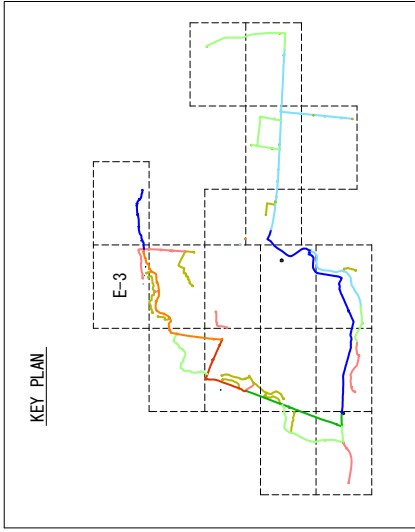
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan (C-3)	APPROVE BY	DATE	DRAWING No	PD-9
	MINISTRY OF INDUSTRY AND HANDICRAFT		PREPARED BY		DATE		SCALE
			CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.				



LEGEND

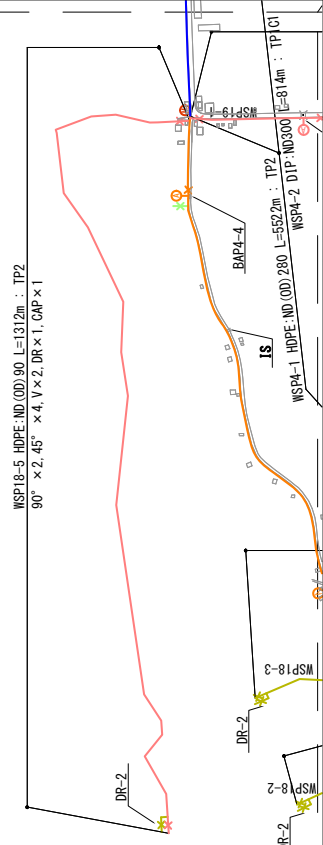
Type of Pavement (TP)	Type of Diameter	Abbreviation	Abbreviation		
①M Asphalt National Road h=1.20m	DIP:ND450	IS	Inverted Siphon	V	Valve
①C-1 Asphalt City Road h=0.80m	DIP:ND400	OC	Over Cross	A	Air Valve
①C-2 Asphalt City Road h=1.00m	DIP:ND350	ISR	Inverted siphon Railway	H	Fire Hydrant
② Road Shoulder h=0.80m	DIP:ND300	BAP	Bridge-attached Pipe	M	Meter
③ Road Shoulder h=1.00m	HDPE-ND(OD)280	RP	Pipe Beam		
④ Concrete h=0.80m	HDPE-ND(OD)225	DR	Drain Pipe	CF	Connecting Fittings
	HDPE-ND(OD)180	RE	Reducer		
	HDPE-ND(OD)110	T	Tee	TP	Type of Pavement
	HDPE-ND(OD)90	ISN	Inverted siphon National Road		
	HDPE-ND(OD)63				
	Existing Pipe				

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION Distribution Pipeline Plan(C-4)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
			CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
						PD-10
						1:8,000

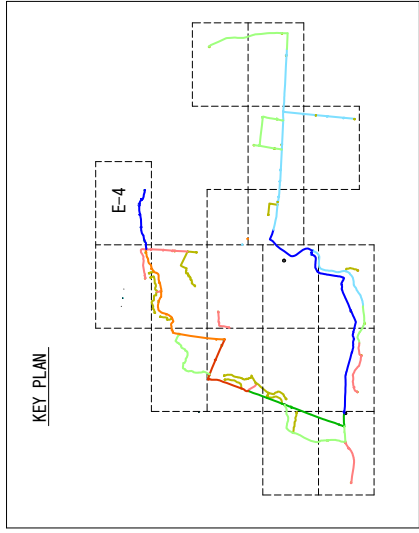


LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	Abbreviation
①N Asphalt, National Road H=1.20m	DIP-ND450	IS	Inverted Siphon
①C-1 Asphalt, City Road H=0.80m	DIP-ND400	OC	Over Cross
①C-2 Asphalt, City Road H=1.00m	DIP-ND350	ISR	Inverted siphon Railway
② Road Shoulder H=0.80m	DIP-ND300	BAP	Bridge-attached Pipe
③ Road Shoulder H=1.00m	HDPE-ND(OD)280	PB	Pipe Beam
④ Concrete H=0.80m	HDPE-ND(OD)225	DR	Drain Pipe
	HDPE-ND(OD)180	RE	Reducer
	HDPE-ND(OD)110	T	Tee
	HDPE-ND(OD)90	ISN	Inverted siphon National Road
	HDPE-ND(OD)63		
	Existing Pipe		
		V	Valve
		A	Air Valve
		H	Fire Hydrant
		M	Meter
		CF	Connecting Fittings
		TP	Type of Pavement

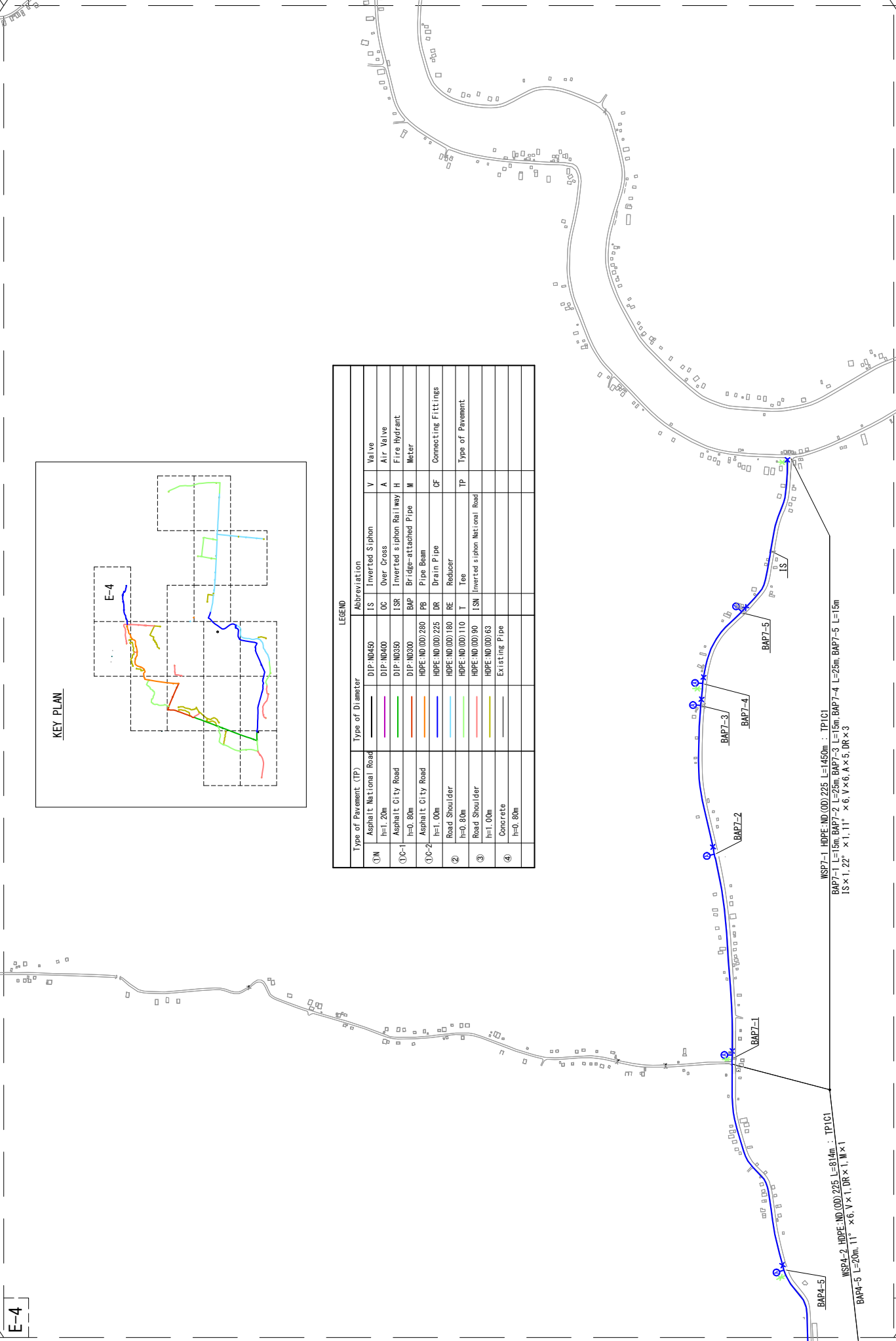


	APPROVE BY	DATE	DRAWING No PD-13
PROJECT	DESCRIPTION		SCALE 1:8,000
PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	Distribution Pipeline Plan (E-3)		DATE
	MINISTRY OF INDUSTRY AND HANDICRAFT		DATE
	CTI ENGINEERING INTERNATIONAL CO., LTD.		DATE
	WATER AND SEWER BUREAU, CITY OF KITAKYUSHU		DATE
	TEC INTERNATIONAL CO., LTD.		DATE

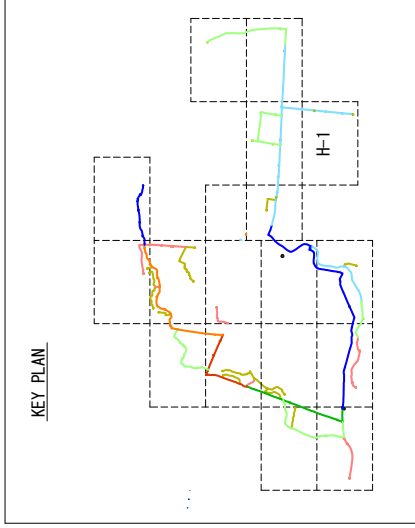


LEGEND

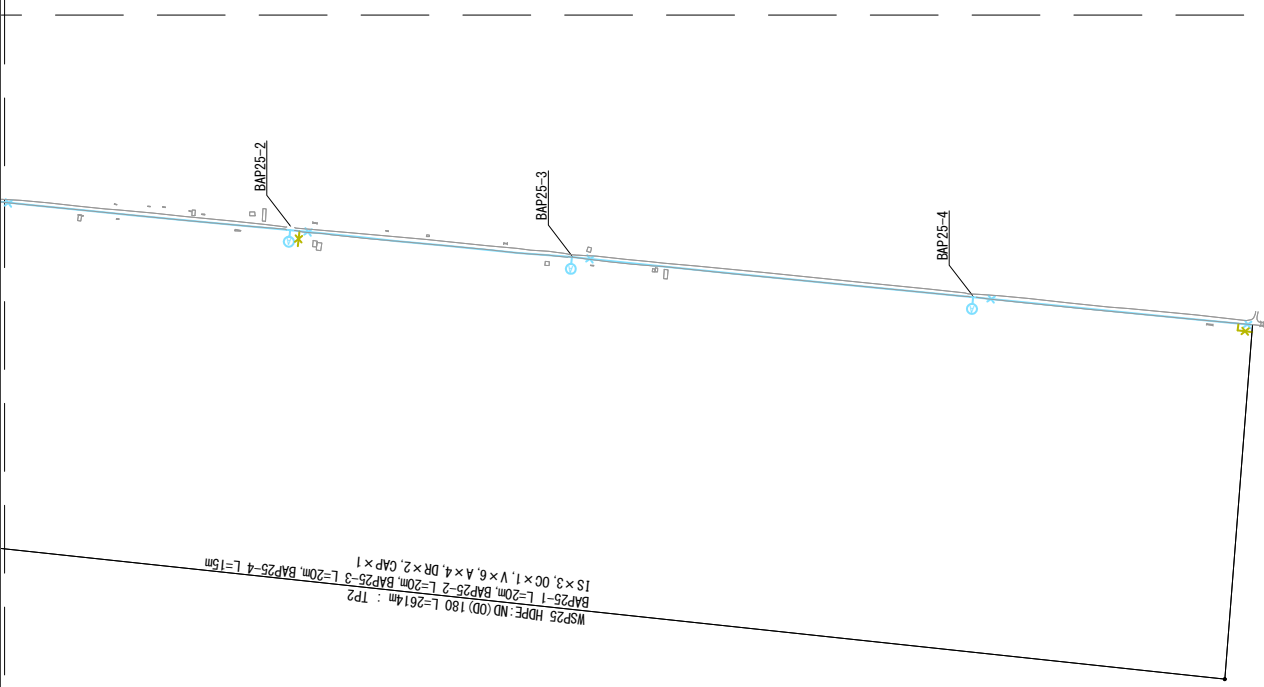
Type of Pavement (TP)	Type of Diameter	Abbreviation	Valve
① M Asphalt National Road h=1.20m	DIP:ND450	IS Inverted Siphon	V Valve
② Asphalt City Road h=0.80m	DIP:ND400	OC Over Cross	A Air Valve
③ Asphalt City Road h=1.00m	DIP:ND350	ISR Inverted siphon Railway	H Fire Hydrant
④ Road Shoulder h=0.80m	DIP:ND300	BAP Bridge-attached Pipe	M Meter
⑤ Road Shoulder h=1.00m	HDPE:ND(OD)280	PB Pipe Beam	CF Connecting Fittings
⑥ Road Shoulder h=1.00m	HDPE:ND(OD)225	DR Drain Pipe	TP Type of Pavement
⑦ Concrete h=0.80m	HDPE:ND(OD)180	RE Reducer	
	HDPE:ND(OD)110	T Tee	
	HDPE:ND(OD)90	ISM Inverted siphon National Road	
	HDPE:ND(OD)63		
	Existing Pipe		



PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(E-4)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
							PD-14
							1:8,000



WSP25 HDPE: ND (OD) 180 L=2614m : TP2
 BAP25-1 L=20m BAP25-2 L=20m BAP25-3 L=20m BAP25-4 L=15m
 1S x 3.0C x 1.0V x 6.4 x 4.0R x 2.0CAP x 1



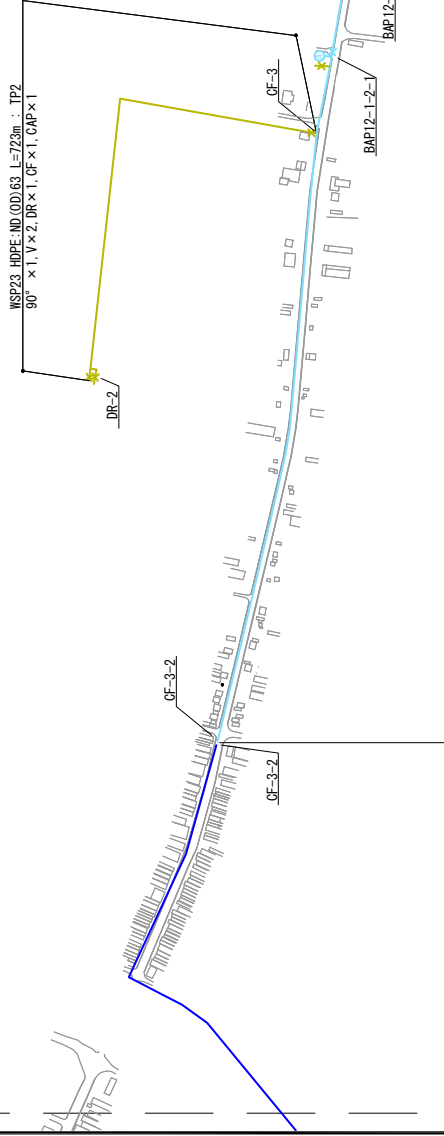
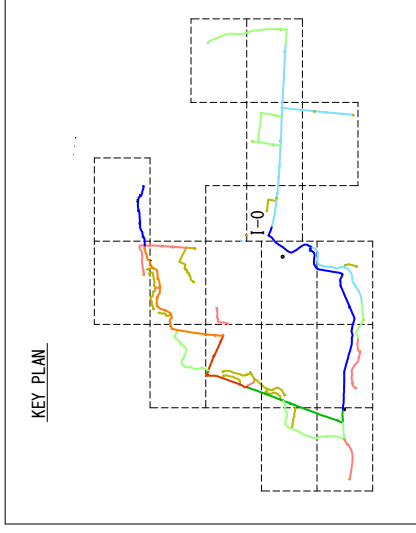
LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	Valve
Asphalt National Road	DIP:ND450	IS Inverted Siphon	V Valve
h=1.20m	DIP:ND400	OC Over Cross	A Air Valve
Asphalt City Road	DIP:ND350	ISR Inverted siphon Railway	H Fire Hydrant
h=0.80m	DIP:ND300	BAP Bridge-attached Pipe	M Meter
Asphalt City Road	HDPE:ND (OD) 280	PB Pipe Beam	
h=1.00m	HDPE:ND (OD) 225	DR Drain Pipe	CF Connecting Fittings
Road Shoulder	HDPE:ND (OD) 180	RE Reducer	
h=0.80m	HDPE:ND (OD) 110	T Tee	TP Type of Pavement
Road Shoulder	HDPE:ND (OD) 90	ISM Inverted siphon National Road	
h=1.00m	HDPE:ND (OD) 63		
Concrete	Existing Pipe		
h=0.80m			

PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT		DESCRIPTION Distribution Pipe Line Plan (H-1)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING NO
				CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
							PD-15 1:8,000

I-0

I-1



MSPI2-3 HDPE-ND(00)63 L=723m : TP2
90° x 1.0V x 2.0DR x 1.0GF x 1.0CMP x 1

Type of Pavement (TP)		Type of Diameter	Abbreviation			
①N	Asphalt National Road	DIP-ND0450	IS	Inverted Siphon	V	Valve
	h=1.20m	DIP-ND0400	OC	Over Cross	A	Air Valve
①C-1	Asphalt City Road	DIP-ND0350	ISR	Inverted siphon Railway	H	Fire Hydrant
	h=0.80m	DIP-ND0300	BAP	Bridge-attached Pipe	M	Meter
①C-2	Asphalt City Road	HDPE-ND(00)280	PB	Pipe Beam		
	h=1.00m	HDPE-ND(00)225	DR	Drain Pipe	GF	Connecting Fittings
②	Road Shoulder	HDPE-ND(00)180	RE	Reducer		
	h=0.80m	HDPE-ND(00)110	T	Tee	TP	Type of Pavement
③	Road Shoulder	HDPE-ND(00)90	ISN	Inverted siphon National Road		
	h=1.00m	HDPE-ND(00)63		Existing Pipe		
④	Concrete					
	h=0.80m					

MSPI2-1-2 HDPE-ND(00)180 L=1900m : TP2
BAPI2-1-2-1 L=50m BAPI2-1-2-2 L=50m
T x 1.0V x 2.0DR x 1.0A x 2.0GF x 1

MSPI2-1-3 HDPE-ND(00)225 L=2100m : TP1C1
45° x 2.22° x 6.0V x 1.0GF x 1

PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT

DESCRIPTION

Distribution Pipeline Plan(I-0)

MINISTRY OF INDUSTRY AND HANDICRAFT

CTI ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

APPROVE BY

DRAWING NO

PREPARED BY

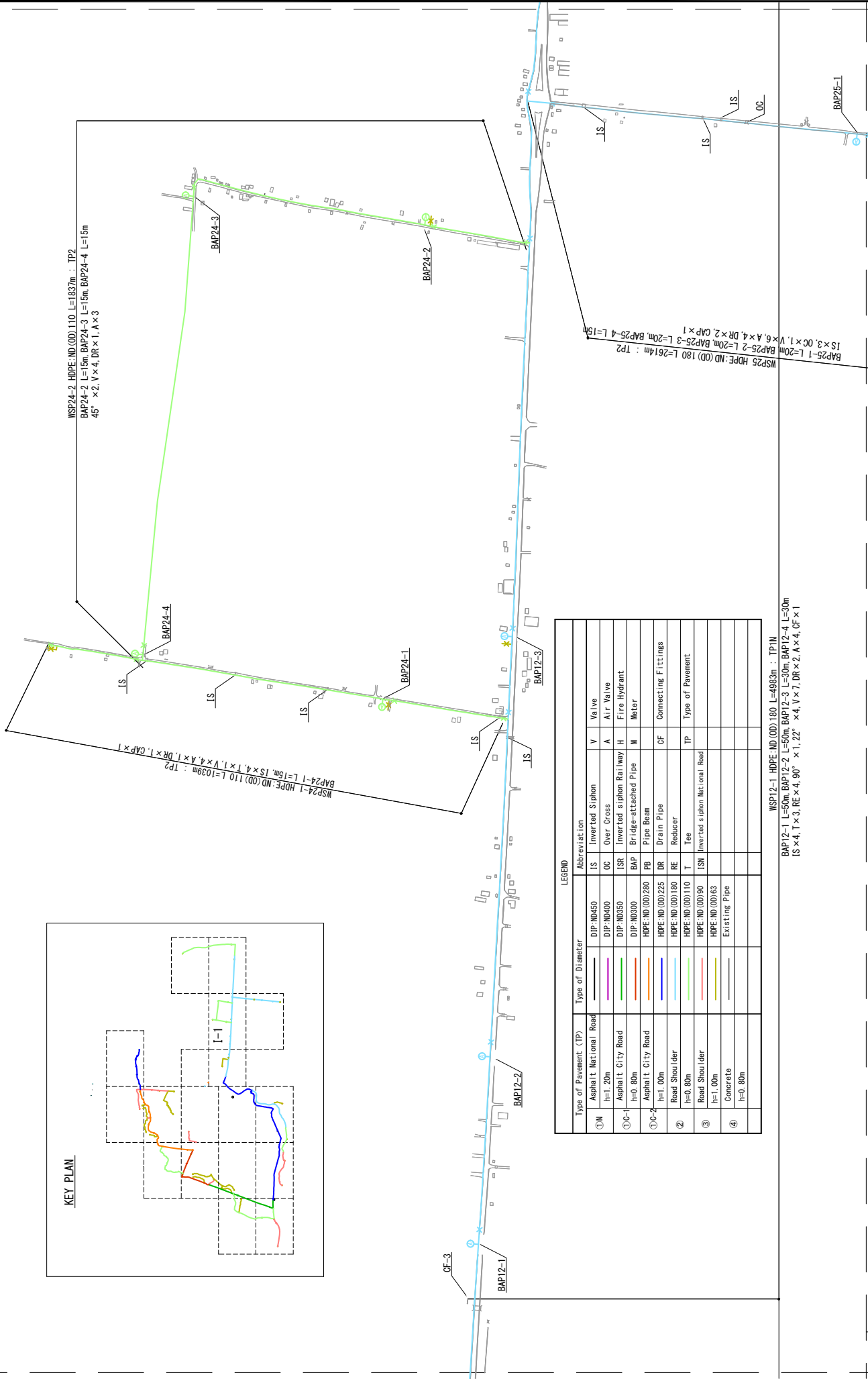
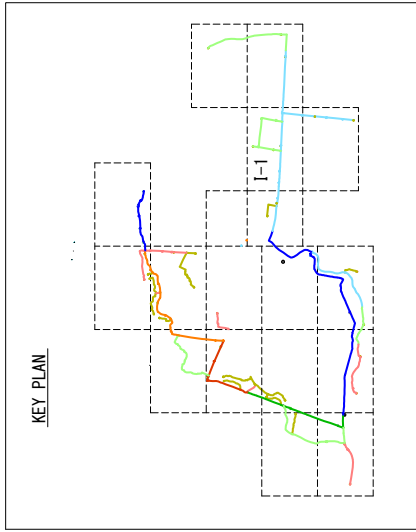
SCALE

DATE

DATE

PD-16

1:8,000



LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	V	Valve
①N Asphalt National Road	DIP:ND450	IS	Inverted Siphon	V Valve
h=1.20m	DIP:ND400	OC	Over Cross	A Air Valve
①C-1 Asphalt City Road	DIP:ND350	ISR	Inverted siphon Railway	H Fire Hydrant
h=0.80m	DIP:ND300	BAP	Bridge-attached Pipe	M Meter
①C-2 Asphalt City Road	HDPE:ND(OD)280	PB	Pipe Beam	
h=1.00m	HDPE:ND(OD)225	DR	Drain Pipe	CF Connecting Fittings
Road Shoulder	HDPE:ND(OD)180	RE	Reducer	
h=0.80m	HDPE:ND(OD)110	T	Tee	TP Type of Pavement
Road Shoulder	HDPE:ND(OD)90	ISN	Inverted siphon National Road	
h=1.00m	HDPE:ND(OD)63			
Concrete	Existing Pipe			
h=0.80m				

WSP12-1 HDPE:ND(OD)180 L=4983m : TP1N
 BAP12-1 L=50m BAP12-2 L=50m BAP12-3 L=30m BAP12-4 L=30m
 IS x4, T x3, RE x4, 90° x1, 22° x4, V x7, DR x2, A x4, CF x1

WSP25-1 HDPE:ND(OD)180 L=2614m : TP2
 BAP25-1 L=20m BAP25-2 L=20m BAP25-3 L=20m BAP25-4 L=13m
 IS x3, OC x1, V x6, A x4, DR x2, CAP x1

WSP24-2 HDPE:ND(OD)110 L=837m : TP2
 BAP24-2 L=15m BAP24-3 L=15m BAP24-4 L=15m
 45° x2, V x4, DR x1, A x3

PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR
 EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT

DESCRIPTION

Distribution Pipe Line Plan(I-1)

MINISTRY OF INDUSTRY AND HANDICRAFT

CTI ENGINEERING INTERNATIONAL CO., LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

APPROVE BY

DRAWING NO

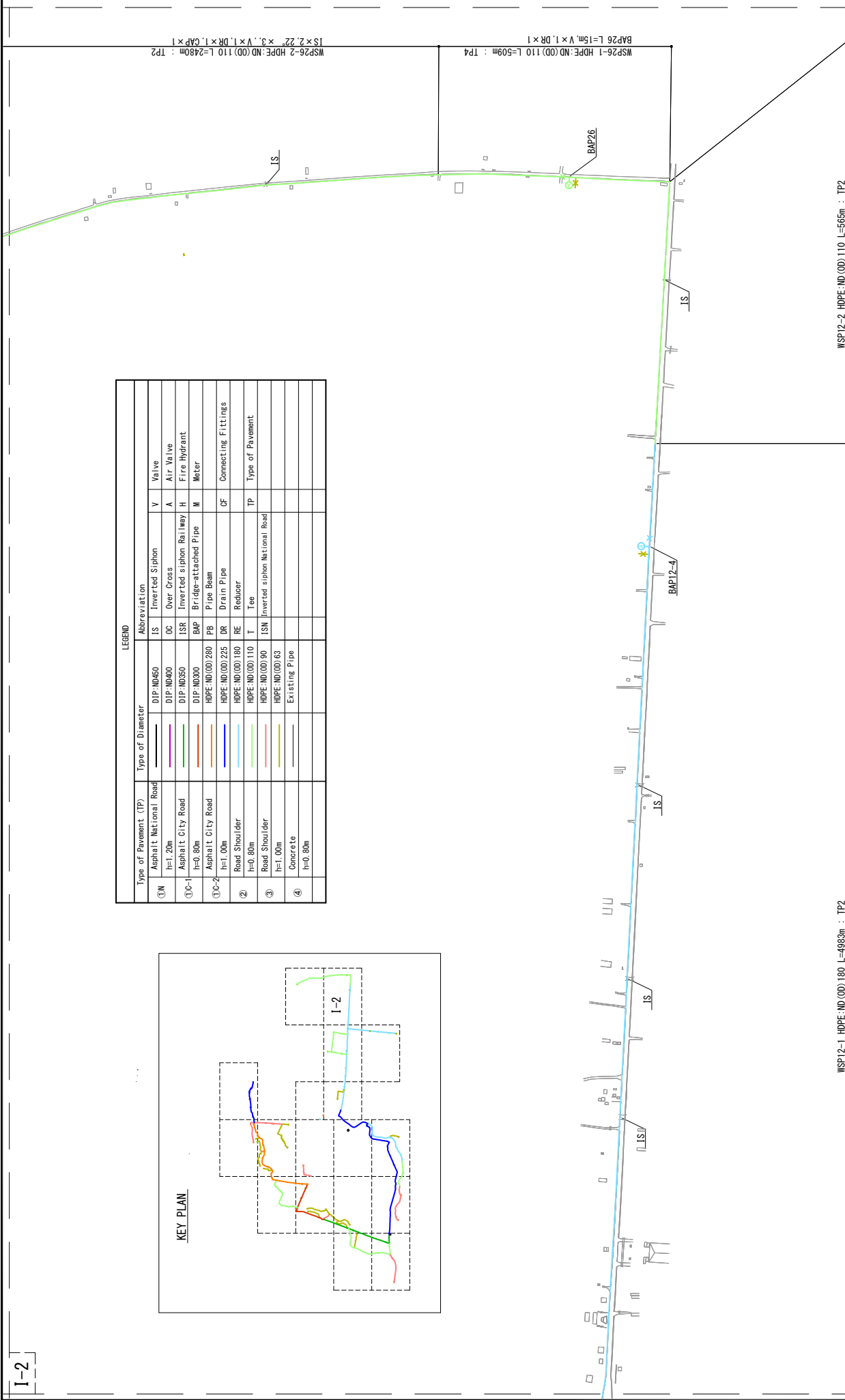
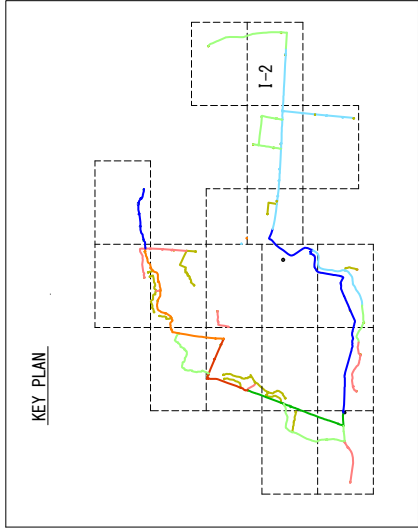
PREPARED BY

SCALE

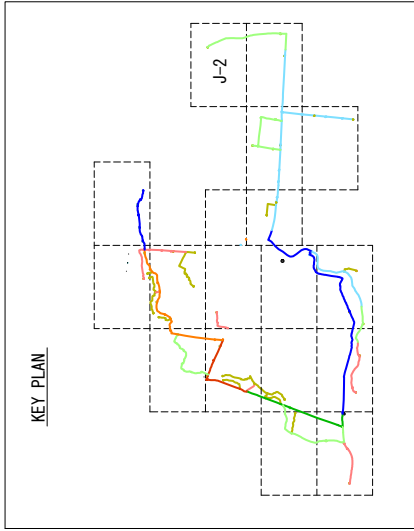
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LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation	
①N Asphalt National Road h=1.20m	DIP:ND450	IS	Inverted Siphon
①② Asphalt City Road h=0.80m	DIP:ND400	OC	Over Cross
①③ Asphalt City Road h=1.00m	DIP:ND350	ISR	Inverted siphon Railway
② Road Shoulder h=0.80m	DIP:ND300	BAP	Bridge-attached Pipe
③ Road Shoulder h=1.00m	HDPE:ND(OD)280	PB	Pipe Beam
④ Concrete h=0.80m	HDPE:ND(OD)225	DR	Drain Pipe
	HDPE:ND(OD)180	RE	Reducer
	HDPE:ND(OD)110	T	Tee
	HDPE:ND(OD)90	ISN	Inverted siphon National Road
	HDPE:ND(OD)63		
	Existing Pipe		
		CF	Connecting Fittings
		TP	Type of Pavement
		V	Valve
		A	Air Valve
		H	Fire Hydrant
		M	Meter

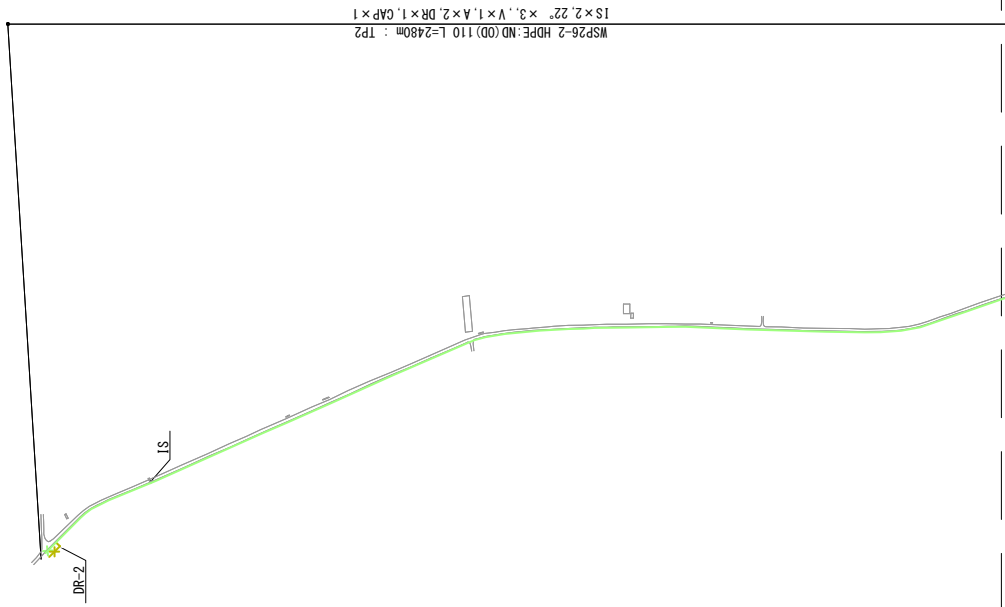


PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(I-2)	MINISTRY OF INDUSTRY AND HANDICRAFT	APPROVE BY	DATE	DRAWING No
				CIT ENGINEERING INTERNATIONAL CO.,LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	SCALE
							PD-18
							1:8,000



LEGEND

Type of Pavement (TP)	Type of Diameter	Abbreviation			
①N Asphalt National Road h=1.20m	DIP: ND450	IS	Inverted Siphon	V	Valve
Asphalt City Road h=0.80m	DIP: ND400	OC	Over Cross	A	Air Valve
①C-1	DIP: ND350	ISR	Inverted siphon Rail way	H	Fire Hydrant
①C-2	DIP: ND300	BAP	Bridge-attached Pipe	M	Meter
Asphalt City Road h=1.00m	HOPE: ND(OD) 280	PB	Pipe Beam		
Road Shoulder h=0.80m	HOPE: ND(OD) 225	DR	Drain Pipe	CF	Connecting Fittings
Road Shoulder h=1.00m	HOPE: ND(OD) 180	RE	Reducer		
Concrete h=0.80m	HOPE: ND(OD) 110	T	Tea	TP	Type of Pavement
	HOPE: ND(OD) 90	ISN	Inverted siphon National Road		
	HOPE: ND(OD) 63				
	Existing Pipe				

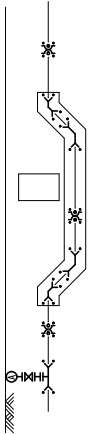


WSP26-2 HPE:ND(OD)110 L=2480m : TP2
1S x 2.22 x 3.1V x 1.1A x 2.DR x 1.1CAP x 1

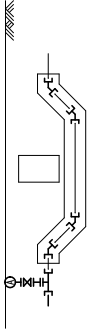
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEMS IN PURSAT	DESCRIPTION	Distribution Pipeline Plan(J-2)	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO.,LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	PD-19
							SCALE
							1:8,000

Typical Drawing for Connecting

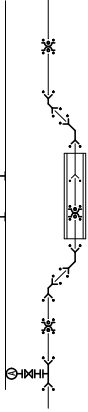
IS (Inverted siphon)



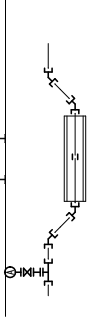
IS (Inverted siphon)



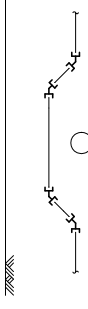
ISR (Inverted Siphon Railway)



ISR (Inverted Siphon Railway)



OC-2 (Over Cross)



Material	Joint Type	Diameter	Number
Double Socket Bend	DIP(T)	250~450 x 45°	4
Double Socket Tee	DIP(T)	250~450	1
Collar	DIP(K)	250~450	3
Restrained Coupling	DIP(T)	250~450	10
Restrained Coupling	DIP(K)	250~450	6
Air Valve	—	80	1
Ball Valve	—	80 x 100H	1
Flange Extension Pipe	—	80 x 150H (h=1.20m)	1
Flange Extension Pipe	—	80 x 150H (h=0.80m)	1
Flange Joint	—	80	3

Material	Joint Type	Diameter	Number
Double Socket Bend	HDPE	63~225 x 45°	4
Double Socket Tee	HDPE	63~225 x 80	1
Air Valve	—	80	1
Ball Valve	—	80 x 100H	1
Flange Extension Pipe	—	80 x 150H (h=1.20m)	1
Flange Extension Pipe	—	80 x 150H (h=0.80m)	1
Flange Joint	—	80	3

Material	Joint Type	Diameter	Number
Double Socket Bend	DIP(T)	250~450 x 45°	4
Double Socket Tee	DIP(T)	250~450	1
Collar	DIP(K)	250~450	3
Restrained Coupling	DIP(T)	250~450	10
Restrained Coupling	DIP(K)	250~450	6
Air Valve	—	80	1
Ball Valve	—	80 x 100H	1
Flange Extension Pipe	—	80 x 150H (h=1.20m)	1
Flange Extension Pipe	—	80 x 150H (h=0.80m)	1
Flange Joint	—	80	3

Material	Joint Type	Diameter	Number
Double Socket Bend	HDPE	63~225 x 45°	4
Double Socket Tee	HDPE	63~225 x 80	1
Socket	HDPE	63~225	1
Air Valve	—	80	1
Ball Valve	—	80 x 100H	1
Flange Extension Pipe	—	80 x 150H (h=1.20m)	1
Flange Extension Pipe	—	80 x 150H (h=0.80m)	1
Flange Joint	—	80	3

Material	Joint Type	Diameter	Number
Double Socket Bend	HDPE	63~225 x 45°	4

PC-1 (Pipe cutting fittings-1)



Material	Joint Type	Diameter	Number
Collar	DIP(K)	250~450	1
Flanged Socket	DIP(T)	250~450	1
Flanged Spigot	DIP(T)	250~450	1
Valve	—	250~450	1
Restrained Coupling	DIP(T)	250~450	1
Restrained Coupling	DIP(K)	250~450	2
Flange Joint	—	250~450	2

PC-2 (Pipe cutting fittings-2)



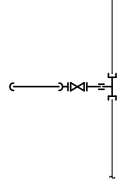
Material	Joint Type	Diameter	Number
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Socket	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

PC-3 (Pipe cutting fittings-1)



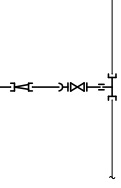
Material	Joint Type	Diameter	Number
Socket	HDPE	63~225	1
Socket	HDPE	63~225	1

PE-1 (Pipe end fittings-1)



Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Socket	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

PE-2 (Pipe end fittings-2)



Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Double Socket Reducer	HDPE	63~225	1
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Socket	HDPE	63~225	1
Cap	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

PROJECT PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

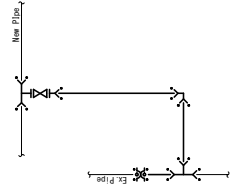
DESCRIPTION Typical Drawing for Pipe Laying (1) Connecting

APPROVE BY MINISTRY OF INDUSTRY AND HANDICRAFT
 PREPARED BY CITI ENGINEERING INTERNATIONAL CO., LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

DRAWING No TYP-1
 SCALE NONE

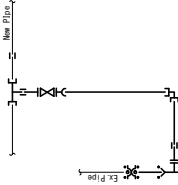
Typical Drawing for Connecting

CF-1 (Connecting fittings-1)



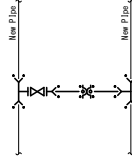
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Reducer	HDPE	80~225	m
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Cap	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

CF-2 (Connecting fittings-2)



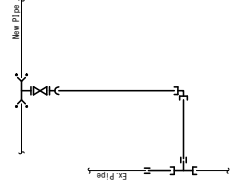
Material	Joint Type	Diameter	Number	Remarks
Straight Pipe	DIP(T)	250~450	2	Ex. Diameter
Triple Socket Tee	DIP(T)	250~450	1	Ex. Diameter
Double Socket Tee	DIP(T)	250~450	1	New x Ex
Double Socket Bend	DIP(T)	250~450 x 90°	1	Ex. Diameter
Collar	DIP(K)	250~450	1	Ex. Diameter
Flanged Socket	DIP(T)	250~450	1	Ex. Diameter
Restrained Coupling	DIP(T)	250~450	2	New Pipe Diameter
Restrained Coupling	DIP(T)	250~450	6	Ex. Diameter
Restrained Coupling	DIP(K)	250~450	2	Ex. Diameter
Valve	—	250~450	1	Ex. Diameter
Flange Joint	—	250~450	2	Ex. Diameter

CF-4 (Connecting fittings-4)



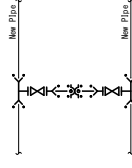
Material	Joint Type	Diameter	Number
Straight Pipe	DIP(T)	250~450	1
Triple Socket Tee	DIP(T)	250~450	1
Double Socket Tee	DIP(T)	250~450	1
Collar	DIP(K)	250~450	1
Flanged Socket	DIP(T)	250~450	1
Restrained Coupling	DIP(T)	250~450	6
Restrained Coupling	DIP(K)	250~450	2
Valve	—	250~450	1
Flange Joint	—	250~450	2

CF-2 (Connecting fittings-2)



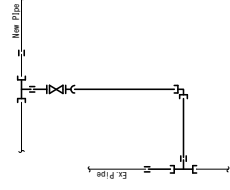
Material	Joint Type	Diameter	Number	Remarks
Straight Pipe	HDPE	63	m	
Double Socket Tee	DIP(T)	80~225	m	
Double Socket Tee	DIP(T)	250~450	1	New x Ex
Double Socket Bend	HDPE	63~225	1	Ex x Ex
Double Socket Bend	HDPE	63~225 x 90°	1	Ex. Diameter
Socket	HDPE	63~225	2	Ex. Diameter
Mechanical Adapter	HDPE	63~225	1	Ex. Diameter
Restrained Coupling	DIP(T)	250~450	2	New Pipe Diameter
Valve	—	63~225	1	Ex. Diameter
Flange Joint	—	63~225	2	Ex. Diameter

CF-4-2 (Connecting fittings-4-2)



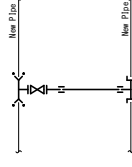
Material	Joint Type	Diameter	Number
Straight Pipe	DIP(T)	250~450	1
Double Socket Tee	DIP(T)	250~450	2
Collar	DIP(K)	250~450	1
Flanged Socket	DIP(T)	250~450	2
Restrained Coupling	DIP(T)	250~450	6
Restrained Coupling	DIP(K)	250~450	2
Valve	—	250~450	1
Flange Joint	—	250~450	4

CF-3 (Connecting fittings-3)



Material	Joint Type	Diameter	Number	Remarks
Straight Pipe	HDPE	63	m	
Double Socket Tee	HDPE	80~225	m	
Double Socket Tee	HDPE	63~225	1	New x Ex
Double Socket Tee	HDPE	63~225	1	Ex. Diameter
Double Socket Bend	HDPE	63~225 x 90°	1	Ex. Diameter
Socket	HDPE	63~225	1	New Pipe Diameter
Socket	HDPE	63~225	3	Ex. Diameter
Mechanical Adapter	HDPE	63~225	1	Ex. Diameter
Stub Flange	HDPE	63~225	1	Ex. Diameter
Valve	—	63~225	1	Ex. Diameter
Flange Joint	—	63~225	2	Ex. Diameter

CF-5 (Connecting fittings-5)



Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	DIP(T)	80~225	m
Double Socket Tee	DIP(T)	250~450	1
Double Socket Tee	HDPE	63~225	1
Socket	HDPE	63~225	2
Stub Flange	HDPE	63~225	1
Restrained Coupling	DIP(T)	250~450	2
Valve	—	63~225	1
Flange Joint	—	63~225	2

PROJECT
 PREPARATORY SURVEY ON THE PROJECT FOR
 EXPANSION OF WATER SUPPLY SYSTEM
 IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION
 Typical Drawing for Pipe Laying (2)
 Connecting

MINISTRY OF INDUSTRY AND HANDICRAFT
 CITI ENGINEERING INTERNATIONAL CO., LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

APPROVE BY

DATE

DRAWING NO

TYP-2

PREPARED BY

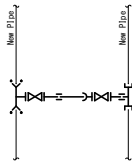
DATE

SCALE

NONE

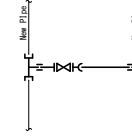
Typical Drawing for Connecting

CF-5-2(Connecting fittings-5-2)



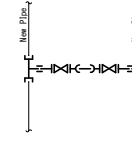
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Double Socket Tee	DIP(T)	250~450	1
Double Socket Tee	HDPE	63~225	1
Socket	HDPE	63~225	2
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	2
Restrained Coupling	DIP(T)	250~450	2
Valve	—	250~450	2
Flange Joint	—	250~450	4

CF-6(Connecting fittings-6)



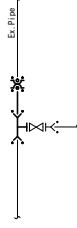
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63~225	m
Double Socket Tee	HDPE	63~225	2
Socket	HDPE	63~225	2
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

CF-6-2(Connecting fittings-6-2)



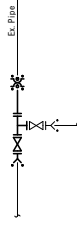
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Double Socket Tee	HDPE	63~225	2
Socket	HDPE	63~225	2
Mechanical Adapter	HDPE	63~225	2
Stub Flange	HDPE	63~225	2
Valve	—	63~225	2
Flange Joint	—	63~225	4

CF-7(Connecting fittings-7)



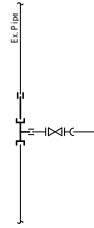
Material	Joint Type	Diameter	Number
Straight Pipe	DIP(T)	250~450	1
Double Socket Tee	DIP(T)	250~450	1
Collar	DIP(K)	250~450	1
Restrained Coupling	DIP(T)	250~450	2
Restrained Coupling	DIP(K)	250~450	2

CF-8(Connecting fittings-8)



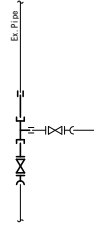
Material	Joint Type	Diameter	Number
Triple Flanged Tee	DIP(T)	250~450	1
Collar	DIP(K)	250~450	1
Flanged Socket	DIP(T)	250~450	1
Flanged Spigot	DIP(T)	250~450	1
Valve	—	250~450	1
Restrained Coupling	DIP(T)	250~450	1
Restrained Coupling	DIP(K)	250~450	2
Flange Joint	—	250~450	3

CF-9(Connecting fittings-9)



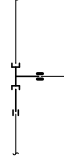
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Socket	HDPE	63~225	1
Socket	HDPE	63~225	1

CF-10(Connecting fittings-10)



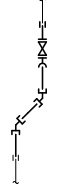
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Double Socket Tee	HDPE	63~225	1
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Socket	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

CF-11



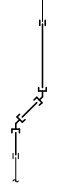
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Tee	HDPE	80~225	m
Double Socket Tee	HDPE	63~225	1
Socket	HDPE	63~225	2

CF-12



Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Band	HDPE	80~225	m
Double Socket Band	HDPE	63~225 × 45°	2
Socket	HDPE	63~225	1
Mechanical Adapter	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2
Stub Flange	HDPE	63~225	1

CF-13



Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63	m
Double Socket Band	HDPE	80~225	m
Double Socket Band	HDPE	63~225 × 45°	2
Socket	HDPE	63~225	1

PROJECT
 PREPARATORY SURVEY ON THE PROJECT FOR
 EXPANSION OF WATER SUPPLY SYSTEM
 IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION
 Typical Drawing for Pipe Laying (3)
 Connecting

APPROVE BY
 DATE

PREPARED BY
 DATE

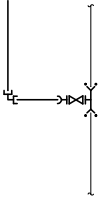
MINISTRY OF INDUSTRY AND HANDICRAFT
 CITI ENGINEERING INTERNATIONAL CO.,LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

DRAWING No
 TYP-3

SCALE
 NONE

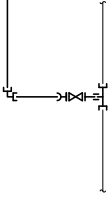
Typical Drawing for Connecting

DR-1 (Drain pipe fittings-1)



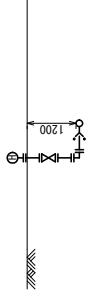
Material	Joint Type	Diameter	Number
Double Socket Tee	DIP (T)	250~480 × 110, 180	1
Restrained Coupling	DIP (T)	250~480	2
Straight Pipe	HDPE	110, 180	m
Double Socket Bend	HDPE	110, 180 × 90°	1
Mechanical Adapter	HDPE	110, 180	1
Valve	—	110, 180	1
Flange Joint	—	110, 180	2

DR-2 (Drain pipe fittings-2)



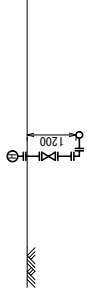
Material	Joint Type	Diameter	Number
Straight Pipe	HDPE	63 80~225	m m
Double Socket Tee	HDPE	63~225 × 63	1
Double Socket Bend	HDPE	63 × 90°	1
Mechanical Adapter	HDPE	63~225	1
Stub Flange	HDPE	63~225	1
Socket	HDPE	63~225	1
Valve	—	63~225	1
Flange Joint	—	63~225	2

H-1 (Fire Hydrant-1)



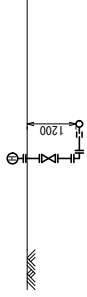
Material	Joint Type	Diameter	Number
Triple Socket Tee	DIP (T)	350~450 × 100	1
Flanged Spigot	DIP (T)	100	1
Double Flanged Bend	—	100 × 90°	1
Flange Extension Pipe	—	100 × 350H	1
Flange Extension Pipe	—	100 × 650H	1
Ball Valve	—	100 × 100H	1
Fire Hydrant (Double Mouths)	—	100	1
Restrained Coupling	DIP (T)	100	1
Flange Joint	—	100	5

H-2 (Fire Hydrant-2)



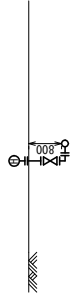
Material	Joint Type	Diameter	Number
Double Socket Tee	DIP (T)	250 × 80	1
Double Flanged Bend	—	80 × 90°	1
Flange Extension Pipe	—	80 × 350H	1
Flange Extension Pipe	—	80 × 650H	1
Ball Valve	—	80 × 100H	1
Fire Hydrant (Single Mouth)	—	80	1
Flange Joint	—	80	5

H-3 (Fire Hydrant-3)



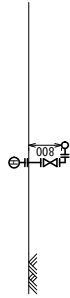
Material	Joint Type	Diameter	Number
Double Socket Tee	HDPE	110~225 × 80	1
Socket	HDPE	80	1
Stub Flange	HDPE	80	1
Double Flanged Bend	—	80	1
Flange Extension Pipe	—	80 × 400H	1
Flange Extension Pipe	—	80 × 650H	1
Ball Valve	—	80 × 100H	1
Fire Hydrant (Single Mouth)	—	80	1
Flange Joint	—	80	5

H-4 (Fire Hydrant-4)



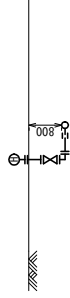
Material	Joint Type	Diameter	Number
Double Socket Tee	DIP (T)	250 × 80	1
Flanged Spigot	DIP (T)	80	1
Double Flanged Bend	—	80	1
Flange Extension Pipe	—	80 × 650H	1
Ball Valve	—	80 × 100H	1
Fire Hydrant (Single Mouth)	—	80	1
Flange Joint	—	80	4

H-5 (Fire Hydrant-5)



Material	Joint Type	Diameter	Number
Double Socket Tee	DIP (T)	350~450 × 100	1
Flanged Spigot	DIP (T)	100	1
Double Flanged Bend	—	100	1
Flange Extension Pipe	—	100 × 650H	1
Ball Valve	—	100 × 100H	1
Fire Hydrant (Double Mouths)	—	100	1
Flange Joint	—	100	4

H-6 (Fire Hydrant-6)



Material	Joint Type	Diameter	Number
Double Socket Tee	HDPE	110~225 × 80	1
Socket	HDPE	80	1
Stub Flange	HDPE	80	1
Double Flanged Bend	—	80	1
Flange Extension Pipe	—	80 × 650H	1
Ball Valve	—	80 × 100H	1
Fire Hydrant (Single Mouth)	—	80	1
Flange Joint	—	80	4

A-1 (Air Valve-1)



Material	Joint Type	Diameter	Number
Double Socket Tee	DIP (T)	250~480 × 80	1
Flange Extension Pipe	—	80 × 500H	1
Ball Valve	—	80 × 100H	1
Air Valve	—	80	1
Restrained Coupling	DIP (T)	200~500	2
Flange Joint	—	80	3

A-2 (Air Valve-2)



Material	Joint Type	Diameter	Number
Double Socket Tee	HDPE	90~220 × 80	1
Flange Extension Pipe	—	80 × 500H	1
Ball Valve	—	80 × 100H	1
Air Valve	—	80	1
Flange Joint	—	80	3

PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEM
IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION

Typical Drawing for Pipe Laying (4)

APPROVE BY

DATE

DRAWING No

MINISTRY OF INDUSTRY AND HANDICRAFT
CTI ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

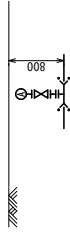
PREPARED BY

SCALE

NONE

Typical Drawing for Connecting

A-3 (Air Valve-3)



Material	Joint Type	Diameter	Number
Double Socket Tee	DIP(T)	250~450×80	1
Flange Extension Pipe	—	80×150H	1
Ball Valve	—	80×100H	1
Air Valve	—	80	1
Restrained Coupling	DIP(T)	250~450	2
Flange Joint	—	250~450	3

A-4 (Air Valve-4)



Material	Joint Type	Diameter	Number
Double Socket Tee	HPPE	63×50	1
Flange Extension Pipe	—	50×150H	1
Ball Valve	—	50×100H	1
Air Valve	—	50	1
Flange Joint	—	50	3

A-5 (Air Valve-5)



Material	Joint Type	Diameter	Number
Double Socket Tee	HPPE	90~225×80	1
Flange Extension Pipe	—	80×150H	1
Ball Valve	—	80×100H	1
Air Valve	—	80	1
Flange Joint	—	80	3

PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEM
IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION

Typical Drawing for Pipe Laying (5)
Connecting

MINISTRY OF INDUSTRY AND HANDICRAFT

CIT ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

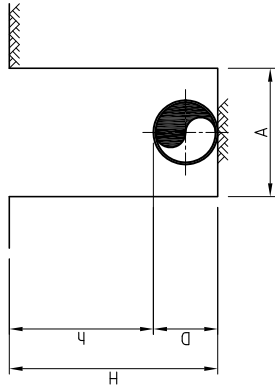
APPROVE BY

DRAWING No
TYP-5

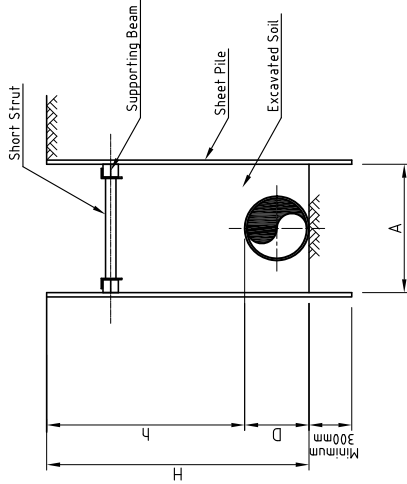
PREPARED BY

SCALE
NONE

Typical Drawing for Pipe Laying



MACHINE EXCAVATION
NORMAL PART



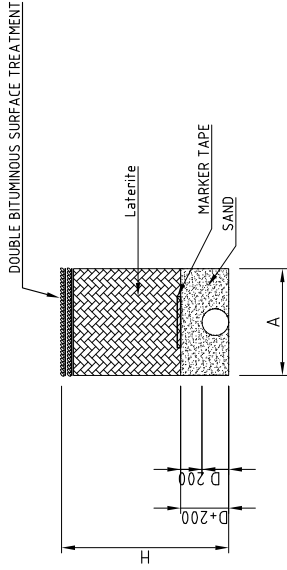
MACHINE EXCAVATION
SHEET PILE PART

TYPICAL SIZE OF TRENCH EXCAVATION (MACHINE EXCAVATION)

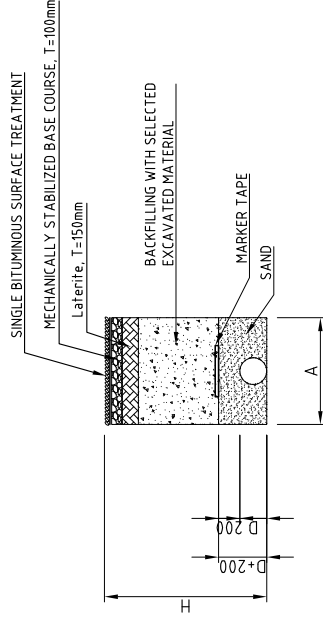
PIPE MATERIAL	NOMINAL PIPE DIAMETER D(mm)	NORMAL PART		SHEET PILE PART	
		TRENCH WIDTH A(m)	DEPTH OF COVER *1 H(m)	TRENCH WIDTH A(m)	DEPTH OF COVER *1 H(m)
HDPE	50(63)	0.50	0.8/1.2	0.87/1.27	0.70
	75(90)	0.50	0.8/1.2	0.89/1.29	0.70
	100(100)	0.50	0.8/1.2	0.91/1.31	0.75
	150(180)	0.50	0.8/1.2	0.96/1.36	0.80
	200(225)	0.50	0.8/1.2	1.22/1.42	0.85
DIP	250	0.50	0.8/1.2	1.05/1.45	0.85
	300	0.55	0.8/1.2	1.10/1.50	0.90
	350	0.60	0.8/1.2	1.15/1.55	1.00
	400	0.70	0.8/1.2	1.20/1.60	1.05
	450	0.75	1.0/1.2	1.45/1.65	1.10

*1 Depth of cover : Depend on the site condition.

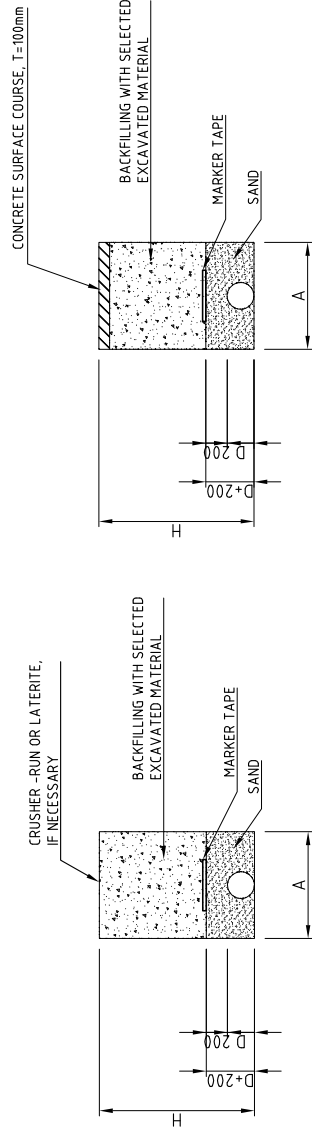
PROJECT
PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEM
IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA



BACKFILL
TP-IN, ROADWAY OF THE NATIONAL ROAD



BACKFILL
TP-IC, CITY ROAD (PAVING)
SHOULDER OF THE NATIONAL ROAD



BACKFILL (TP-3)
TP-2.3, ROAD SHOULDER
BACKFILL
TP-4, CONCRETE SURFACE COURSE

DESCRIPTION

Typical Drawing for Pipe Laying
General Earth Work for Pipe Laying

MINISTRY OF INDUSTRY AND HANDICRAFT

CIT ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

APPROVE BY

DATE

DRAWING No

TYP-6

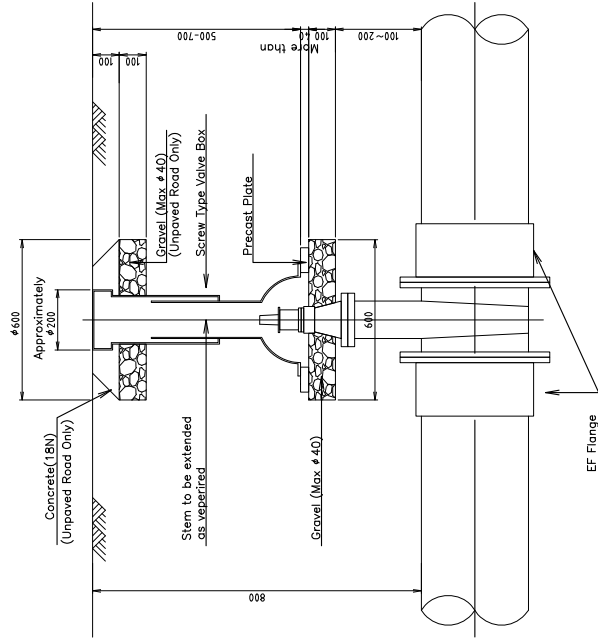
PREPARED BY

DATE

SCALE

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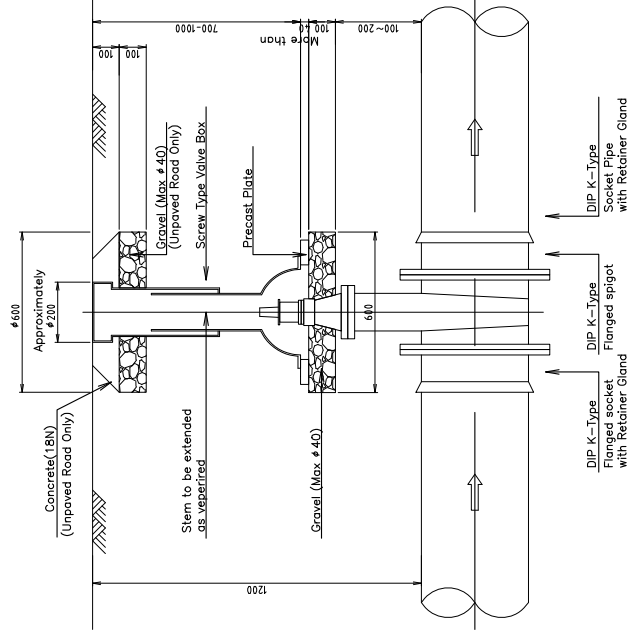
Typical Drawing for Sluice Valve



SLUICE VALVE INSTALLATION
(HDPE:ND(OD)63-225)

NOTE

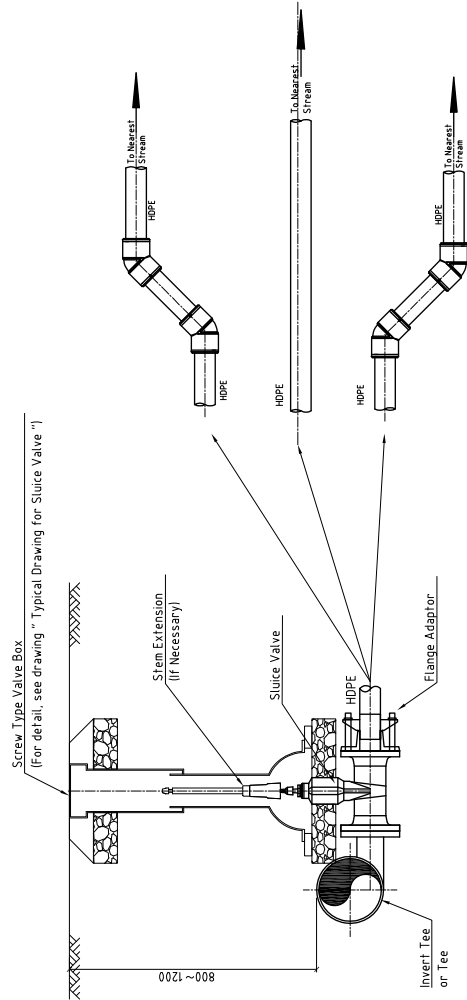
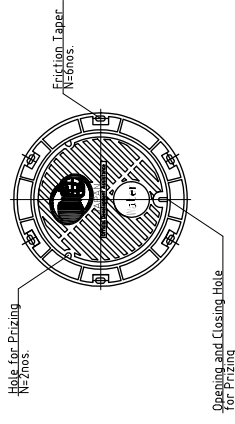
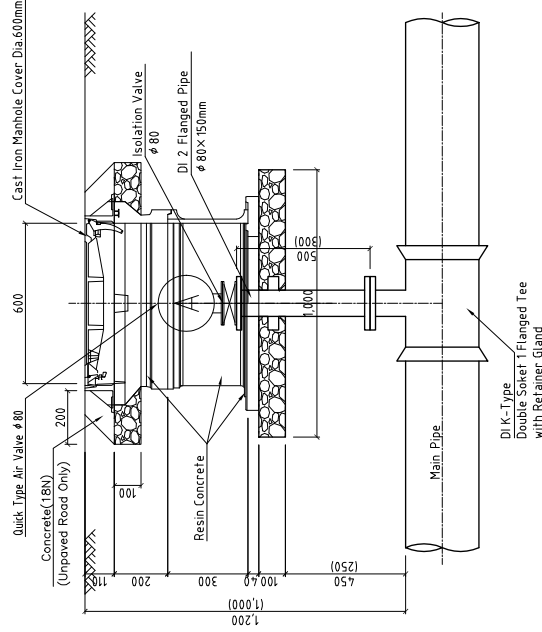
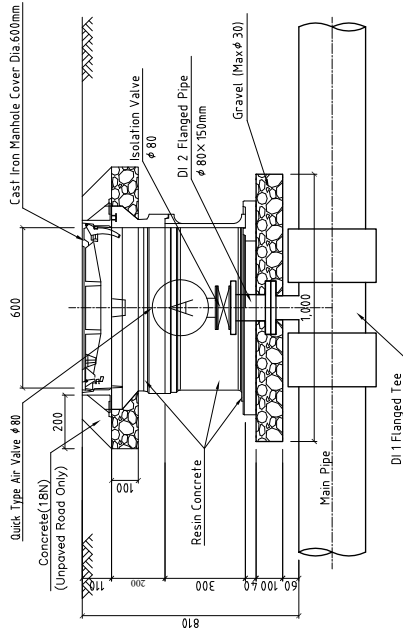
1. ALL SLUICE VALVES LESS THAN 400mm DIA WILL HAVE NO CHAMBERS AND WILL BE INSTALLED SEMLER TO WASH OUT VALVES HEAVY-DUTY SURFACE BOXES AT THE ROAD LEVEL TO OPERATE THEM.
2. ALL DIMENSIONS ARE IN mm.



SLUICE VALVE INSTALLATION
(DIP:ND250-450)

<p>PROJECT</p> <p style="text-align: center;">PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA</p>	<p>DESCRIPTION</p> <p style="text-align: center;">Typical Drawing for Pipe Laying Sluice Valve</p>	<p>MINISTRY OF INDUSTRY AND HANDICRAFT</p> <p style="text-align: center;">CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.</p>	<p>APPROVE BY</p> <p style="text-align: center;">DATE</p>	<p>DRAWING No</p> <p style="text-align: center;">TYP-7</p>
			<p>PREPARED BY</p> <p style="text-align: center;">DATE</p>	<p>SCALE</p> <p style="text-align: center;">NONE</p>

Typical Drawing for Installation of Air Valve and Washout



CRITERIA FOR AIR VALVE AND WASH OUT

MAIN PIPE	MAIN PIPE MATERIAL	BRANCH PIPE for AIR VALVE	BRANCH PIPE for WASH OUT
ϕ 50(63)	HDPE	ϕ 50	ϕ 50
ϕ 75(90)		ϕ 80	ϕ 50
ϕ 100(110)		ϕ 80	ϕ 50
ϕ 150(180)		ϕ 80	ϕ 50
ϕ 200(225)		ϕ 80	ϕ 50
ϕ 250	DIP	ϕ 80	ϕ 100
ϕ 300		ϕ 80	ϕ 100
ϕ 350		ϕ 80	ϕ 150
ϕ 400		ϕ 80	ϕ 150
ϕ 450		ϕ 80	ϕ 150

NOTE

1. THE THICKNESS OF THE BLINDING LAYER SPECIFIED IN THE DRAWING IS FOR NORMAL SOIL TYPES. HOWEVER, IF THE STRUCTURE IS FOUND ON VERY WEAK SOIL SUCH AS PEAT, A GROUND STABILIZATION METHOD, AS DIRECTED BY THE ENGINEER, SHALL BE FOLLOWED.
2. THE TOP OF THE AIR VALVE CHAMBER SHOULD BE AT THE SAME LEVEL AS THE ROAD TOP LEVEL.
3. THE VALVE BOXES FOR WASHOUT MAY BE ON THE BANK OF THE ROAD.
4. ALL DIMENSIONS ARE IN mm.

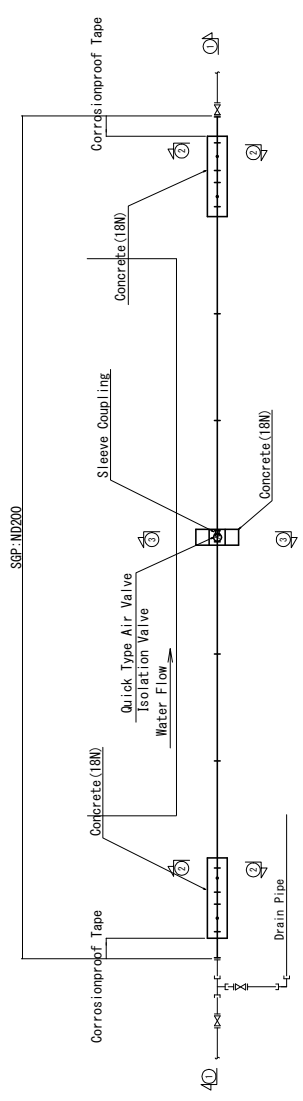
PROJECT
PREPARATORY SURVEY ON THE PROJECT FOR
EXPANSION OF WATER SUPPLY SYSTEM
IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION
Typical Drawing for Pipe Laying
Installation of Air Valve and Washout

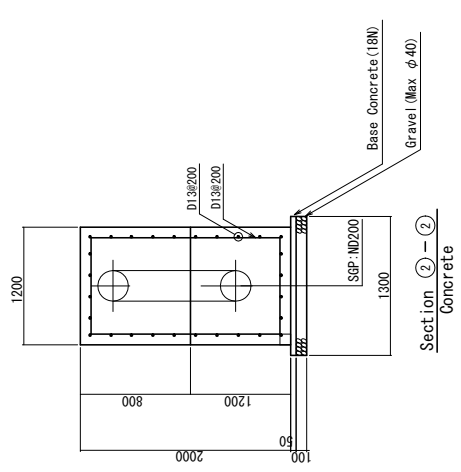
MINISTRY OF INDUSTRY AND HANDICRAFT
CTI ENGINEERING INTERNATIONAL CO., LTD.
WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
TEC INTERNATIONAL CO., LTD.

APPROVE BY
DATE
DRAWING No
TYP-8

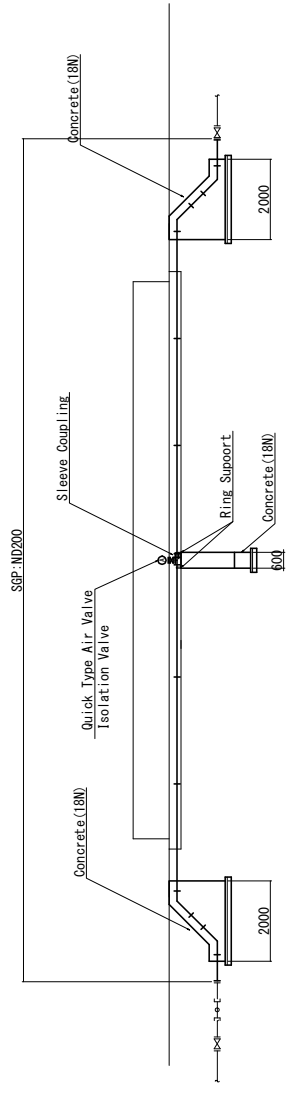
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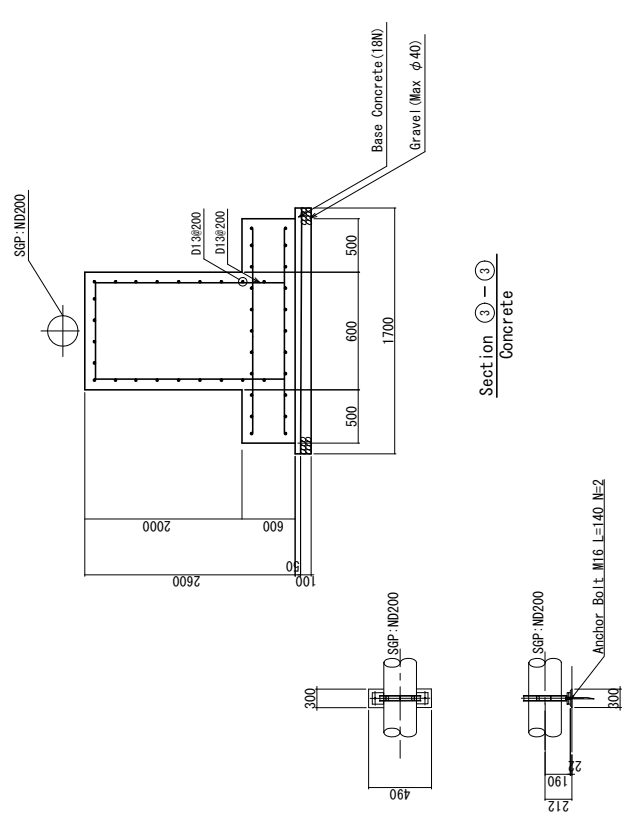
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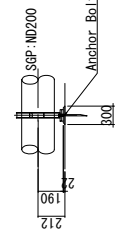
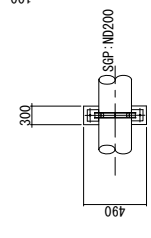
Section 2-2
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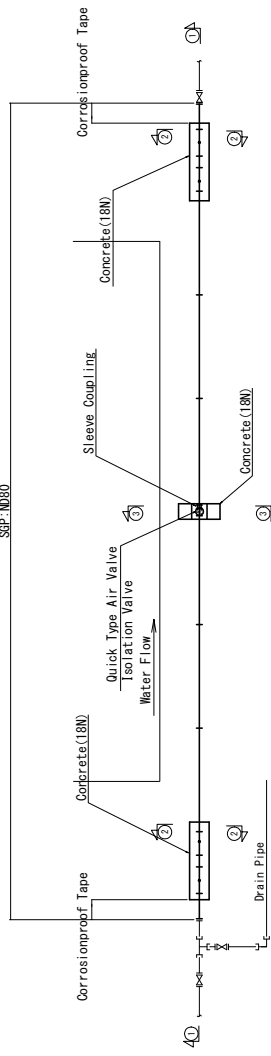
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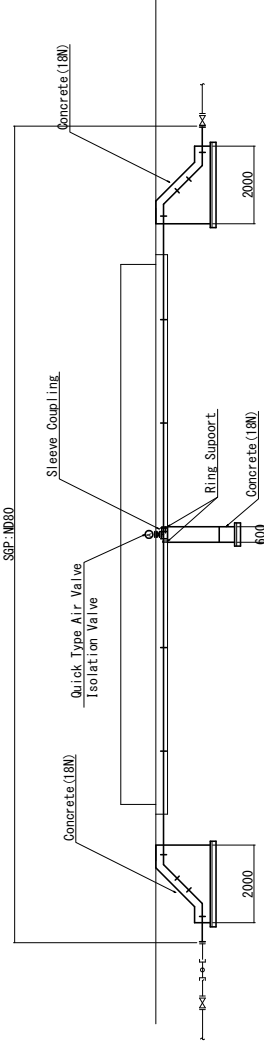
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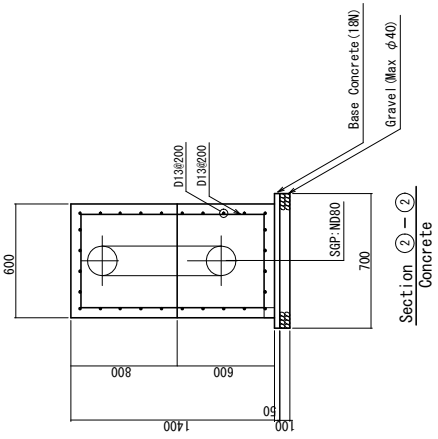
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PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	Typical Drawing for Pipe Beam ND200	CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	PREPARED BY	DATE	TYP-9
					SCALE
					NONE



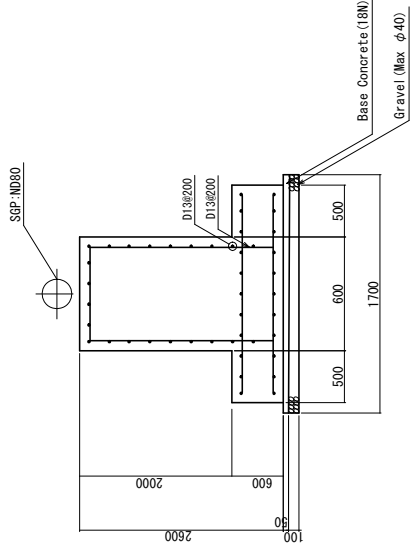
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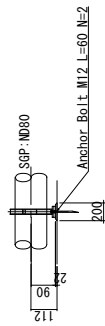
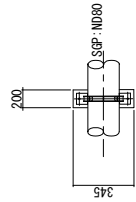
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Section 2-2

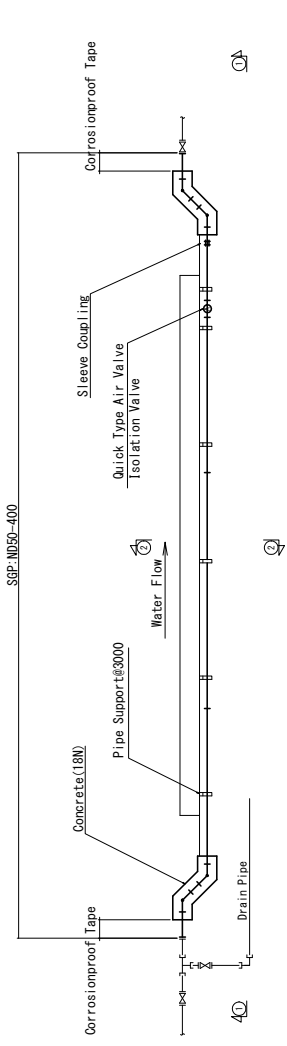


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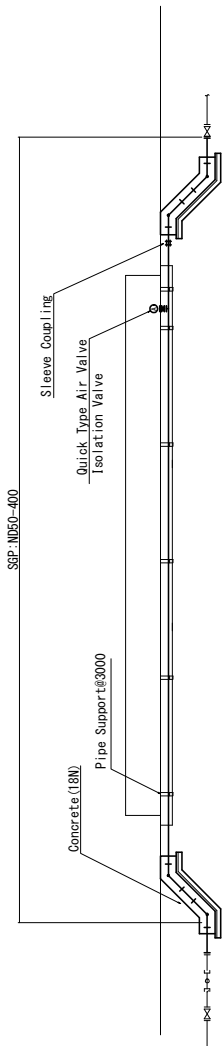


Ring Support

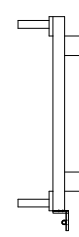
PROJECT	PREPARATORY SURVEY ON THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA	DESCRIPTION	Typical Drawing for Pipe Beam ND80	MINISTRY OF INDUSTRY AND HANDICRAFT CTI ENGINEERING INTERNATIONAL CO., LTD. WATER AND SEWER BUREAU, CITY OF KITAKYUSHU TEC INTERNATIONAL CO., LTD.	APPROVE BY	DATE	DRAWING No
					PREPARED BY	DATE	SCALE
							TYP-10 NONE



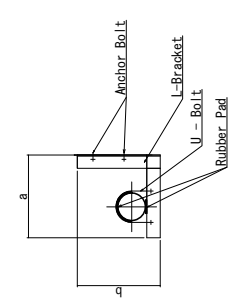
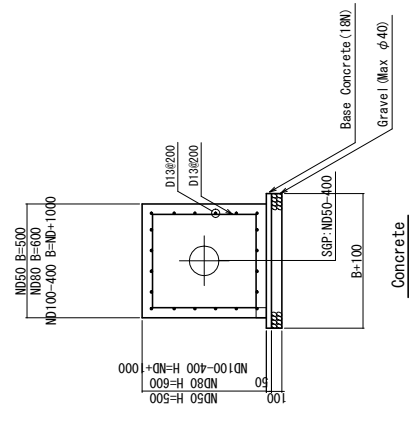
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Section ① - ①



Section ② - ②



Pipe Support

ND	a	b	L-Bracket	Anchor Bolt	U - Bolt	Rubber Pad
50	250	300	65 × 65 × 6 SUS304	M12 L=60	50A M12	t=10mm L=5cm
80	300	350	65 × 65 × 6 SUS304	M12 L=60	80A M12	t=10mm L=5cm
100	400	400	65 × 65 × 6 SUS304	M12 L=60	100A M12	t=10mm L=5cm
150	400	400	65 × 65 × 6 SUS304	M16 L=140	150A M16	t=10mm L=10cm
200	450	400	75 × 75 × 6 SUS304	M16 L=140	200A M20	t=10mm L=10cm
250	500	450	100 × 100 × 10 SUS304	M16 L=140	250A M20	t=10mm L=10cm
350	550	500	100 × 100 × 10 SUS304	M16 L=140	350A M20	t=10mm L=10cm
400	550	500	100 × 100 × 10 SUS304	M16 L=140	400A M20	t=10mm L=10cm

PROJECT
 PREPARATORY SURVEY ON THE PROJECT FOR
 EXPANSION OF WATER SUPPLY SYSTEM
 IN PURSAT AND SVAY RIENG IN THE KINGDOM OF CAMBODIA

DESCRIPTION
 Typical Drawing for
 Bridge Attached Pipe

APPROVE BY
 DATE

PREPARED BY
 DATE


MINISTRY OF INDUSTRY AND HANDICRAFT
 CTT ENGINEERING INTERNATIONAL CO., LTD.
 WATER AND SEWER BUREAU, CITY OF KITAKYUSHU
 TEC INTERNATIONAL CO., LTD.

DRAWING No
 TYP-11

SCALE
 NONE

資料 7.3

取水方式に関する代替案と比較表

		Case1: Damnak Ampil Headworks 直上流での取水	Case2: 既存取水地点直上流での取水
概要図			
取水位置選定の経緯		Damnak Ampil Headworks から既存取水地点までの中間区間は、砂州の移動が著しく、乾季の水位低下時に取水障害を生じる懸念があるため、取水地点としては不適と判断された。既存の取水地点については、砂州の移動は少なく滞筋は安定しているが、既存取水施設におけるポンプビット内への河床材の堆積が著しいため、上流の Damnak Ampil Headworks 直上流から取水を行う場合(Case1)と既存取水地点の近傍で取水を行う場合(Case2)の詳細な比較が必要となった。	
概要		<ul style="list-style-type: none"> • Damnak Ampil Headworks 直上流から取水し、No.5 の地点に浄水場を計画する。 	<ul style="list-style-type: none"> • 既存取水ポンプ場の近傍 No.00 から取水し、No.2 の地点に浄水場を計画する。
1	取水の安定性	<ul style="list-style-type: none"> • 堰の直上流であり、灌漑水路での取水実績がある。 • 河道が安定している区間である。 • 堰上流のため、乾季も十分な水深が確保される。 	<ul style="list-style-type: none"> • 既存取水施設の直上流であり、取水実績がある。 • 河道が安定している区間である。
2	水源の状況	<ul style="list-style-type: none"> • Damnak Ampil Headworks が存在することで流速が遅く、河床が安定するため、砂質土（掃流砂・浮遊砂・ウォッシュロード）の巻き上げを抑制でき、Case2 と比べ沈砂池への土砂堆積を抑制できる。 • 河道幅が広く、(170m)、流量の増加に対して河床材の巻き上げが発生し難い。 • 上述の通り河床材の巻き上げが発生し難く、砂質土が Case2 より少ないため、沈砂池の寸法が小さくなる。 • Case2 に比べ、ポンプビットへのシルト分の堆積は抑制され、ポンプへのダメージは抑制される。 	<ul style="list-style-type: none"> • 河道幅が狭いことから流速が早くなる（7月流量観測時の平均流速 0.5m/s）ため、砂質土（掃流砂・浮遊砂・ウォッシュロード）の巻き上げが Case1 に比べ多い。 • 河道幅が狭く、(70m)、流量の増加に対して河床材の巻き上げが発生し易い。 • Case1 に比べて水位変動が大きく砂質土が多いため、沈砂池の寸法が大きくなる。 • Case1 より規模の大きい沈砂池でも細砂より粒径の小さいシルト分は完全除去できないことから、ポンプビットに堆積する。そのためシルト分のポンプビットへの流入によるポンプへのダメージは Case1 と比べて大きい。
3	施工性	<ul style="list-style-type: none"> • LWL:EL16.175m, HWL:EL19.175m 程度である。(水位差 3.0m) • Damnak Ampil Headworks が存在することで Case2 の地点と比べ、雨季と乾季の水位変化は小さく、大掛りな仮設施設が不要となる。 • 確保出来る用地は 100mx100m 程度 (取水施設用+施工ヤード用)であり、周辺に近接民家が少なく Case2 と比べ施工のための広いヤード確保が容易であるとともに、工事の際の民家への影響を抑制出来る。 • 取水施設の深度は、沈砂池深さ 6.5m、ポンプ室深さ 10.5mと Case2 より小さく、近隣民家が存在しないため、オープン掘削での施工が可能。そのため、施工期間が Case2 より短くなる。 • 沈砂池 : オープン掘削にて施工 • ポンプ室 : オープン掘削にて施工 • 河床高:EL14.202m、M (middle) WL:EL17.675mであり、河川側の締切矢板高は河床高から MWL の高さに余裕を 0.5m 見込んで3.9m程度を想定。 • 河川側締め切り : III型矢板 l=11.5m (締切高さ 3.9m) • 工用車両の頻繁な搬入出が発生するが、取水ポンプ場及び浄水場建設地点とも主要道路に面しているため、工用車両は容易に搬入出が可能である。 	<ul style="list-style-type: none"> • LWL:EL11.635m, HWL:EL17.635m である。(水位差 6.0m) • Case1 の地点と比べ、乾季と雨季の水位差が大きく、ドライ施工及び近隣民家との近接施工のために大規模な山留めが必要となる。 • 確保出来る用地は 50mx50m 程度 (取水施設用)であり、周辺に民家が近接しており、Case1 と比べ施工ヤードの確保が困難であるとともに、工事の際の民家への影響を免れない。 • 取水施設の深度は、沈砂池深さ 11.0m、ポンプ室深さ 14.5mと大きく、また、近隣民家が存在するため、オープン掘削での工事は困難であり、土留め矢板を適用した工事が必要となる。そのため、施工期間が Case1 より長くなる。 • 沈砂池 : IV型矢板 l=15m • ポンプ室 : IV型矢板 l=20m • 河床高:EL10.134m、M (middle) WL:EL14.635mであり、河川側の締切矢板高は河床高から MWL の高さに余裕を 0.5m 見込んで5.1m程度を想定。 • 河川側締め切り : IV型矢板 l=15.5m (締切高さ 5.1m) • 工用車両の頻繁な搬入出が発生し、取水ポンプ場近隣には民家が存在するとともに、浄水場までのアクセスは住宅街の狭隘な道路 (幅 5m) を通過せねばならず、工用車両の搬入出は困難である。従って、工用道路は別途構築する必要がある。
4	施工期間	<ul style="list-style-type: none"> • 導水管が長くなり、Case2 より管の施工に時間がかかる。 	<ul style="list-style-type: none"> • 導水管が短く、管の施工は短期間で可能である。
5	周辺環境への影響	<ul style="list-style-type: none"> • 取水ポンプ場及び浄水場建設地点とも隣接民家は少なく、近接施工は発生しない。 	<ul style="list-style-type: none"> • 取水施設建設は、深度掘削 (11m~14.5m)が必要となるが、近隣民家が存在し、かつ確保出来る用地が狭い (50mx50m 程度) ため、近接施工に配慮が必要。 • 浄水場を NO.2 地点とした場合、住宅街の進入路 (幅 5m) を通過せねばならないが、工用道路としては重機の往来に伴い道路拡幅が必要である。そのため、道路沿いの民家に影響が及ぶ。 • 浄水場に隣接して小学校が存在し、工事に伴いアクセス道路と通学路の併用が困難となり仮通学路の整備や通学路の迂回路の設定等が必要となる。
6	施設概要	<ul style="list-style-type: none"> • 【取水ポンプ場】 • 沈砂池 : LxWxH=24.3mx8.4mx6.5m ≒ 1,330m³ • 沈砂池サイズは Case2 に比べ小さくなる。堰直上流であるため、LWL が比較的高く、掘削深を抑制できる。 • ポンプ室 : LxWxH=13mx6.5mx10.5m • 地盤高から水面(LWL)までが浅く、Case2 より小規模となる。 • 【造成高さ】 • 現況地盤が高いことから、冠水の恐れが少なく、地盤の嵩上げは抑制される。 • 取水ポンプ場 : 0.5m 嵩上げ (現況高 EL18.070m→計画高 EL18.570m) • 浄水場 : 1.0m 嵩上げ (現況高 EL17.650m→計画高 EL18.650m) • 浄水場進入路 : 嵩上げ不要 (現況高 EL18.650m) • 嵩上げ造成周辺の土留め擁壁は、上記嵩上げ高に 0.5m の根入れ深を確保。 • 【導水管】 • DC1Pφ350mm, L=8,000m (導水管延長は、Case2 の 5 倍以上となる) 	<ul style="list-style-type: none"> • 【取水ポンプ場】 • 沈砂池 : LxWxH=30.4mx7mx11.0m ≒ 2,340m³ • 沈砂池サイズは Case1 に比べ大きくなる。Case1 に比べ LWL が低く、現況河床以深までの掘り下げが必要となる。このため、近隣家屋への影響を避けるために矢板による山留めが必要となる。 • ポンプ室 : LxWxH=13.6mx8.1mx14.5m • 地盤高から水面(LWL)までが深く、Case1 より大規模となる。 • 【造成高さ】 • 建設予定地は洪水時の冠水エリアとなっているため、水没対策のため地盤の嵩上げが必要となる。 • 取水ポンプ場 : 2.0m 嵩上げ (現況高 EL16.135m→計画高 EL18.135m) • 浄水場 : 2.0m 嵩上げ (現況高 EL15.260m→計画高 EL17.260m) • 浄水場進入路 : 1.0m 嵩上げ (現況高 EL16.260m→計画高 EL17.260m) • 嵩上げ造成周辺の土留め擁壁は、上記嵩上げ高に 0.5m の根入れ深を確保。 • 【導水管】 • DC1Pφ350mm, L=1,500m (導水管の延長は短い)
7	機電施設	<ul style="list-style-type: none"> • ポンプ取付位置が地盤より比較的浅いため、横軸ポンプが選定できる。 • 全揚程 : 37m (導水管延長が長いため、揚程が大きくなる) • ポンプ口径 150mm • ポンプ台数 : 2duty +1 stand-by • @Q=5.04m³/min • 電動機出力が大きい (出力 30kW/台) 	<ul style="list-style-type: none"> • ポンプ取付位置が地盤より深い、横軸ポンプの選定も可能性である。 • 全揚程 : 21m • ポンプ口径 150mm • ポンプ台数 : 2duty +1 stand-by • @Q=5.04m³/min • 電動機出力が小さい (出力 15kW/台)
8	維持管理	<ul style="list-style-type: none"> • ポンプ消耗部品点数がなく、交換頻度は Case2 と比べて格段に低減され、維持管理費が軽減できる。 • 取水ポンプ場の常駐は必要としない。浄水場は常駐が必要となるため、浄水場から取水ポンプ場へ定期的に通う必要がある。 	<ul style="list-style-type: none"> • 沈砂池への土砂堆積量が多量となり、Case1 と比べ頻繁な沈砂池の清掃 (人力) が必要となる。(6 人 x5 日、年 4 回) • 既存浄水場から近く、人員の行き来が容易である。
9	経済性 (詳細は別添)	<ul style="list-style-type: none"> • イニシャルコスト: 344,633 (千円) • : 36,531 (千円) /年 • ランニングコスト: 24,616 (千円) /年 <ul style="list-style-type: none"> • 導水管のコストは Case2 と比べ割高であるが、以下のコストが Case2 と比べ割安であり、総合的に割安となる。 ①水位変動の小さい場所での沈砂池及びポンプ室建設に伴う本体土木工事費の縮減。 ②広い用地で、かつ水位変動の小さい場所での取水施設の建設に伴う仮設備等の縮減。 ③対象地は氾濫域では無く取水施設及び浄水場建設に伴う嵩上げ造成不要。 	<ul style="list-style-type: none"> • イニシャルコスト: 423,067 (千円) • : 44,845 (千円) /年 • ランニングコスト: 22,054 (千円) /年 <ul style="list-style-type: none"> • 導水管のコストは Case1 と比べ割高であるが、以下のコストが Case1 と比べ割高であり、総合的に割高となる。 ①水位変動の大きい場所での沈砂池及びポンプ室建設に伴う本体土木工事費の増加 ②狭隘かつ水位変動の大きい場所での取水施設の建設に伴う仮設備等の増加。 ③氾濫域への取水施設及び浄水場建設に伴う嵩上げ造成等の増加。
評価		○	▲

資料 7.4

導水管水理計算

1 導水管水理計算

導水管の管径は、取水ポンプから浄水場着水井まで計画導水量を導水する条件で水理計算を行い、適正な流速及び妥当な損失水頭/ポンプ揚程と管径との間の経済的関係を検討し、φ350 とする。

管路の流量公式は、ヘーゼン・ウィリアムズ (Hazen・Williams) 公式を用いる。

$$\text{流量公式: } H=10.666 \times C^{-1.85} \times D^{-4.87} \times Q^{1.85} \times L$$

H：摩擦損失水頭 (m)

C：流速係数：110

D：管径 (m)

Q：流量 (m³/s) 7,260m³/日=5.042m³/min=0.0840m³/s

L：延長 (m) 取水ポンプから浄水場着水井までの導水管延長 8,320m

表 1 に各管径の水理計算結果を示す。導水管の流速は、管内の濁質の停滞を防ぐために 0.3m/s 以上を確保する。経済的管径は、流速が 1m 前後とされている。損失水頭をみると、φ300 は計画水量に対して 53.5m の損失が見込まれ、将来の配水区域拡張には対応できないことが予測される。φ350 と φ400 管路の損失水頭差はポンプの仕様に大きく影響しない。よって、導水管の管径は経済性の優れた φ350 とする。

表 1 導水管の水理計算結果

流量 (m ³ /秒) Q	管径 (mm) D	延長 (m) L	流速係数 C	流速 (m/s) V	動水勾配 I	損失水頭 (m) H=L×I	備考
0.0840	φ700	8,320	110	0.22	0.00010	0.83	
	φ600			0.30	0.00022	1.83	
	φ500			0.43	0.00053	4.41	
	φ450			0.53	0.00089	7.40	
	φ400			0.67	0.00158	13.15	
	φ350			0.88	0.00303	25.21	採用
	φ300			1.20	0.00643	53.50	
	φ250			1.72	0.01562	129.96	
	φ200			2.69	0.04630	385.22	

出典：JICA 調査団

資料 7.5

管種の選定

1 管種の選定

高密度ポリエチレン管、ダクタイル鋳鉄管、鋼管の比較表を表 2 に示す。カンボジアにおける実績、経済性、施工性、維持管理性を考慮し、導水管、配水管の適用管種は以下のとおりとする。

導水管 一般部：φ350mm ダクタイル鋳鉄管 (DCIP)

河川横断部：φ350mm 鋼管 (SP) (腐食対策)

配水管 一般部：φ300mm 以上：ダクタイル鋳鉄管 (DCIP)、ISO 規格 (T 形)

φ250mm 以下：高密度ポリエチレン管 (HDPE) (PN10)

河川横断部：鋼管 (SP) 防食塗装

表 2 管種の比較

管 種	高密度ポリエチレン管 (HDPE)	ダクタイル鋳鉄管 (DCIP)	鋼管 (SP)
適用実績	カンボジアでは 200mm 以下の実績は圧倒的に多い。250mm 以上では適用例が少ない。	カンボジアでは 250mm 以上の実績は圧倒的に多い。	埋設配管としての実績は少ない。添架管、水管橋等では使用されている。
耐性	管体強度は金属管に比べて小さい。耐食性に優れている。熱、紫外線に弱い。有機溶剤による浸透に注意する必要がある。融着継手により一体化ができ、耐震性が高い。	管体強度が大きく、強靱性に富み、衝撃に強い。耐久性がある。ブッシュオン方式の継手は融着や溶接継手と比べて、耐震性が低い。	管体強度が大きく、強靱性に富み、衝撃に強い。耐久性がある。電食に対する配慮が必要。内外の防食面に損傷を受けると腐食しやすい。溶接継手により一体化ができ、耐震性が高い。
施工性	重量が軽く施工性が良い。雨天時や湧水地盤での施工が困難である。融着継手は、コントローラや特殊な工具を必要とする。	ブッシュオン方式の継手で施工性が良い。重量が比較的重い。異形管防護を必要とする。	加工性がよく、複雑な配管も自由な配管が可能。溶接継手は施工が難しく、施工不良の懸念がある。内外面の防食対策を必要とする。
維持管理性	200mm 以下は、これまでの実績等より補修等可能。250mm 以上は、補修管材や接続器具の調達が難しく、迅速な対応ができない可能性がある。	250mm 以上は、これまでの実績等より補修等可能。	施工技術が必要であるため、相対的に時間を要すると考えられる。
経済性	安価	相対的に高価	相対的に高価

出典: JICA 調査団

資料 7.6

管路布設位置・埋設深さ等

1 管路布設位置・埋設深さ等

道路管理者（DPWT）と設計対象路線を対象とした道路占用工事条件の確認、また将来関連計画の情報収集を行った。

一般に、カンボジアの道路網は、公共事業省（MPWT）が管理する道路と、農村開発省（MRD）が管理する農村道路で構成されている。

1-1 布設位置・埋設深さ

MPWT は、各タイプの道路について公的施設及びサービスの建設（光ケーブル、給水ネットワークの埋設等）の占用条件を次のように規定している。

- ・ 1 桁の国道（道路中心から 30m 端点より 5m 以内） 公共事業省（MPWT）所管
- ・ 2 桁の国道（道路中心から 25m 端点より 5m 以内） 同上
- ・ 3 桁の国道（道路中心から 20m 端点より 5m 以内） 同上
- ・ 農村道路（道路中心から 15m 端点より 5m 以内） 農村開発省（MRD）所管
- ・ 村の道路（実際の状況に依存する）

これによりがたい場合、路肩部に埋設も可能である。埋設深さは、道路表面から 0.5～1m とする。1 桁の国道横断する場合は、非開削工法を適用する必要がある、また、MPWT へ公式に許可申請する必要がある。

1-2 道路構造・舗装構成、舗装復旧

標準道路構造・舗装構成の例を図 1 及び図 2 に示す。舗装復旧は、布設配管中心から両サイド 0.5m までとする。

1-3 道路橋添架

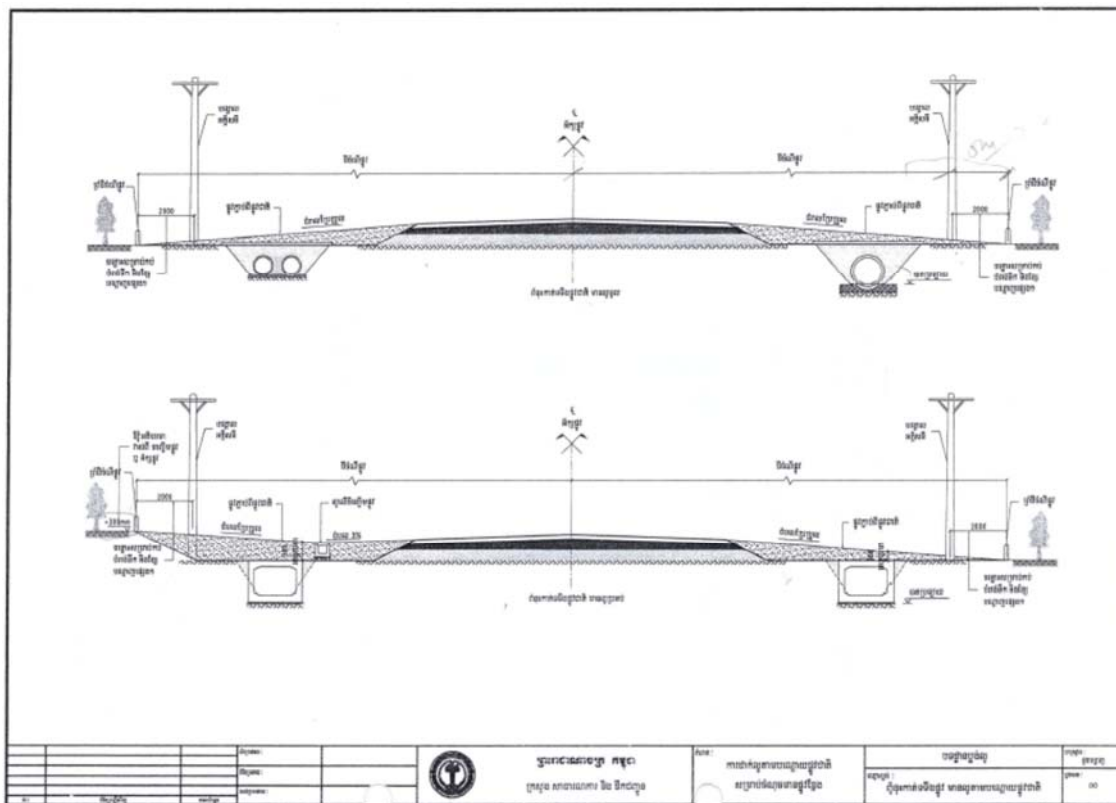
口径 500mm までの管路の道路橋添架について、番号が 1 桁の国道に対しては MPWT に公式に許可申請する必要がある。番号が 3 桁の国道への添架については DPWT へ、農村道路や村の道路への添架については MRD へ通知するだけでよい。なお、通常、MPWT の許可を求める手続きには約 1 カ月を要する。

1-4 鉄道横断

鉄道横断の場合は、埋設深さは鉄道敷き法尻より 1.5～2m、さや管方式とする等、非開削工法を適用する必要がある、MPWT に公式に許可申請する必要がある。

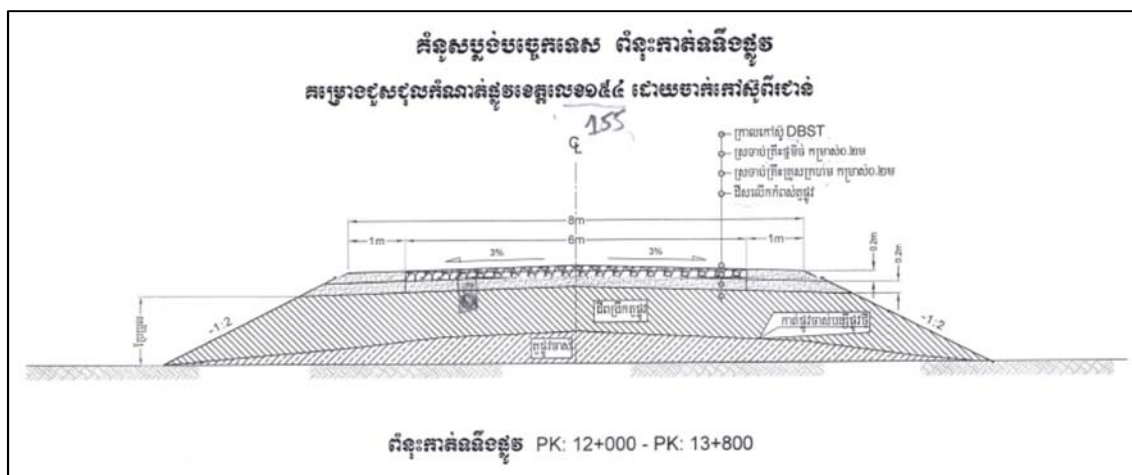
1-5 将来関連計画

設計対象路線では、具体的な計画はない。現在、休止中の鉄道のリハビリ構想があるとのことだが詳細は不明のため、本プロジェクトでは考慮しない。



出典：DPWT

図 1 標準道路占有工事条件の例



出典：DPWT

図 2 標準道路構造・舗装構成の例

資料 7.7

計画時間最大配水量を算定する際の時間係数の設定

1 計画時間最大配水量を算定する際の時間係数の設定

表 3に示すプルサット市の既存配水区域配水量監視システムにより計測された 2015 年の日配水量上位 3 日における配水トレンドによると、既存配水区域の最大時間係数は 1.30 (≒1.28) である。当該区域と同規模程度での他都市計画(過去の無償支援)では、表 4のとおり、1.70 程度が採用されている。これらを踏まえ、カンボジア国政府と協議の結果 1.30 を採用することとした。

表 3 プルサット市既存給水区域における一日最大配水時の時刻別配水量

時刻	2015年7月7日		2015年3月7日		2015年2月28日	
	(A)時間配水量(m ³)	(A)/(C)	(A)時間配水量(m ³)	(A)/(C)	(A)時間配水量(m ³)	(A)/(C)
1:00	216	0.79	153	0.58	166	0.65
2:00	210	0.77	147	0.56	159	0.62
3:00	209	0.76	146	0.56	155	0.60
4:00	211	0.77	146	0.56	157	0.61
5:00	221	0.81	166	0.63	169	0.66
6:00	272	0.99	236	0.90	219	0.85
7:00	322	1.18	313	1.19	314	1.22
8:00	318	1.16	329	1.26	328	1.28
9:00	309	1.13	321	1.23	312	1.21
10:00	301	1.10	311	1.19	302	1.18
11:00	302	1.10	311	1.19	300	1.17
12:00	301	1.10	312	1.19	305	1.19
13:00	297	1.08	302	1.15	296	1.15
14:00	291	1.06	299	1.14	294	1.14
15:00	289	1.05	294	1.12	292	1.14
16:00	292	1.07	299	1.14	288	1.12
17:00	290	1.06	298	1.14	304	1.18
18:00	303	1.11	321	1.23	314	1.22
19:00	308	1.12	319	1.22	306	1.19
20:00	307	1.12	292	1.11	292	1.14
21:00	290	1.06	268	1.02	275	1.07
22:00	268	0.98	249	0.95	251	0.98
23:00	240	0.88	233	0.89	195	0.76
24:00	219	0.80	219	0.84	168	0.65
(B)1日合計配水量	6,586	-	6,284	-	6,161	-
(C)時間平均配水量	274	-	262	-	257	-

※2015年の一日配水量上位3日。2016年以降は配水量記録システムの故障により記録なし。

出典：JICA 調査団

表 4 カンボジア国他都市の計画時間係数

項目	コンボンチャム市	バタンバン市	カンポット市
計画一日最大給水量	16,200 m ³ /日	32,473 m ³ /日	13,260 m ³ /日
時間係数	1.72	1.65	1.75

資料 7.8

計画池容量の算出

1 配水池容量の算出

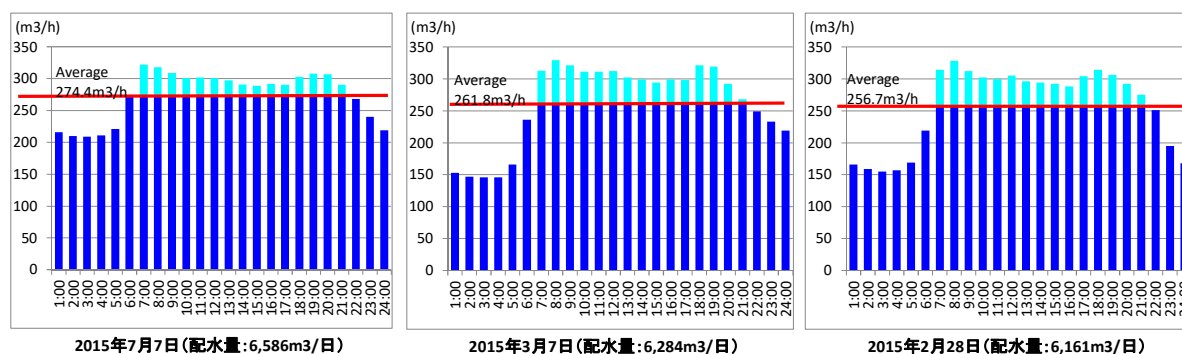
配水池は、需要水量の時間変動が調整でき、かつ、非常時においても一定の時間給水できる機能を持つことが必要である。

既存配水池容量（公称 2,000m³）をみると、過去の一日最大配水量（6,586m³/日）の 7.3 時間分を有している。時間変動調整容量を求めると、下図のとおり一日最大配水時の時間当たりの配水量が時間平均配水量を超えた水量の合計は 410～670m³（下図の水色部）であり、最大で一日最大配水量の 2.6 時間分となっている。

非常時対応容量として、配水池より上流側の対応分（水質事故、施設事故等）及び配水池より下流側の対応分（施設事故、消火用水量等）を考慮する必要がある。

一方、当該区域と同規模程度での他都市計画(過去の無償支援)では、表 5 のとおり、3.5～6.5 時間分となっている。

以上を参考とし、カンボジア国政府との協議結果、常時や非常時の安定給水を図るため、配水池容量は 8 時間分とし、2,200m³ (6,600 m³×8/24) とする。



※2015 年の一日配水量上位 3 日間。2016 年以降は配水量記録システムの故障により記録なし。
出典：JICA 調査団

図 3 過去一日最大配水時の時刻別配水量

表 5 カンボジア国他都市の計画配水池容量

項目	コンボンチャム市	バタンバン市	カンポット市
計画一日最大給水量	16,200 m ³ /日	32,473 m ³ /日	13,260 m ³ /日
配水池容量	5.2 時間分	6.5 時間分	3.5 時間分