

### 3.2.3 Gate Floor Slab

TYPE OF WORK : GATE FLOOR SLAB  
 LOCATION : CONCRETE (TYPE-C1)

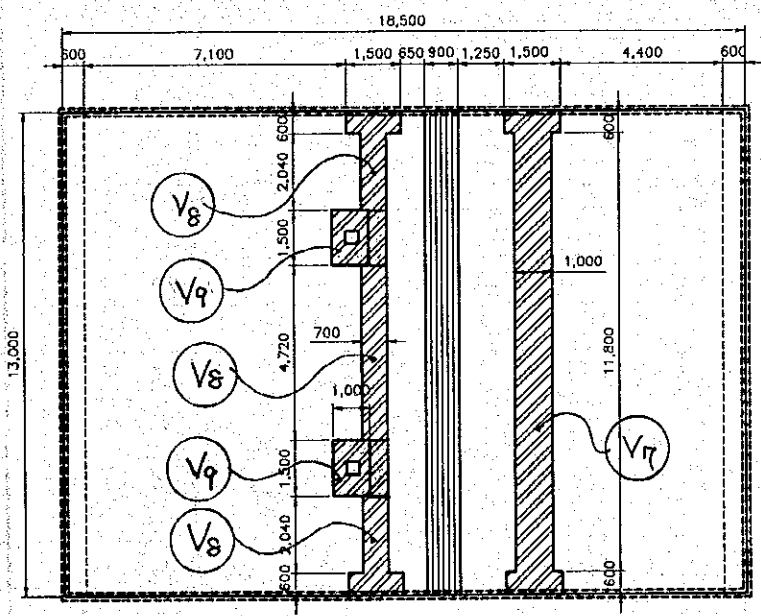
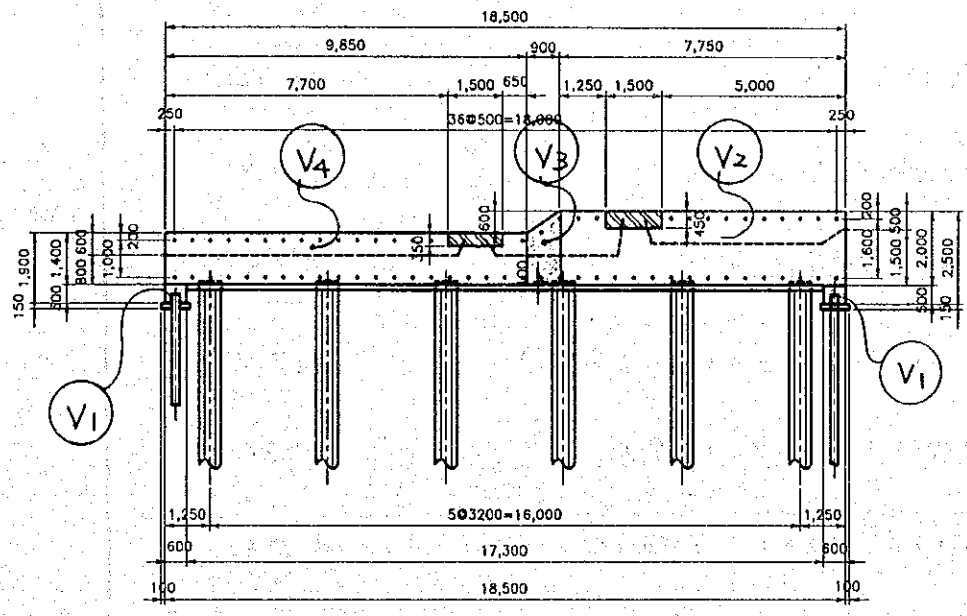
PER 1 PLACE

CALCULATION	RESULT
$V_1 = 0.60 \times 0.50 \times 13.00 \times 2 = 7.800$	
$V_2 = 7.75 \times 2.00 \times 13.00 = 201.500$	
$V_3 = (2.00 + 1.40) \times \frac{1}{2} \times 0.90 \times 13.00 = 19.890$	
$V_4 = 9.85 \times 1.40 \times 13.00 = 179.270$	
(Deduction for PC Pile)	
$V_5 = -\frac{\pi}{4} \times 0.60^2 \times 0.10 \times 30 \text{ piles} = -0.848$	
(Deduction for PC Sheet Pile)	
$V_6 = -0.22 \times 0.25 \times 13.00 = -0.715$	
(Deduction for Blockout)	
$V_7 = -\{(0.60 \times 1.50) \times 2 + (11.80 \times 1.00)\} \times 0.45 = -6.120$	
$V_8 = -\{(0.60 \times 1.50) \times 2 + (2.04 \times 0.70) \times 2 + (4.72 \times 0.70)\} \times 0.35 = -2.786$	
$V_9 = -\{(0.50 \times 0.35) + (1.00 \times 0.80)\} \times 1.50 \times 2 = -2.925$	
<b>TOTAL = 395.066</b>	<b>395.066 m<sup>3</sup></b>

TYPE OF WORK : GATE FLOOR SLAB  
 CONCRETE (TYPE-C1)

LOCATION :

EXPLANATORY DRAWING



TYPE OF WORK : GATE FLOOR SLAB  
 LOCATION : FORM

(1/2)

CALCULATION	RESULT
(H < 4.0m)	
$A_1 = 2.50 \times 13.00$	$= 32.500$
$A_2 = 1.90 \times 13.00$	$= 24.700$
$A_3 = 0.35 \times 13.00 \times 2$	$= 9.100$
$A_4 = 0.50 \times 0.60 \times 2$	$= 0.600$
$A_5 = 7.75 \times 2.00 - (1.50 \times 0.45)$	$= 14.825$
$A_6 = (2.00 + 1.40) \times \frac{1}{2} \times 0.90$	$= 1.530$
$A_7 = \sqrt{(0.90)^2 + (0.60)^2} \times 13.00$	$= 14.062$
$A_8 = 9.85 \times 1.40 - (1.50 \times 0.35)$	$= 13.265$
$A_9 = 11.80 \times 0.45 \times 2$	$= 10.620$
$A_{10} = 0.60 \times 0.45 \times 2 \times 2$	$= 1.080$
$A_{11} = 0.25 \times 0.45 \times 2 \times 2$	$= 0.450$
$A_{12} = 11.80 \times 0.35$	$= 4.130$
$A_{13} = 2.04 \times 0.35 \times 2$	$= 1.428$
$A_{14} = 4.72 \times 0.35$	$= 1.652$
$A_{15} = 0.60 \times 0.35 \times 2 \times 2$	$= 0.840$
$A_{16} = 0.40 \times 0.35 \times 2 \times 2$	$= 0.560$

TYPE OF WORK :  
LOCATION :

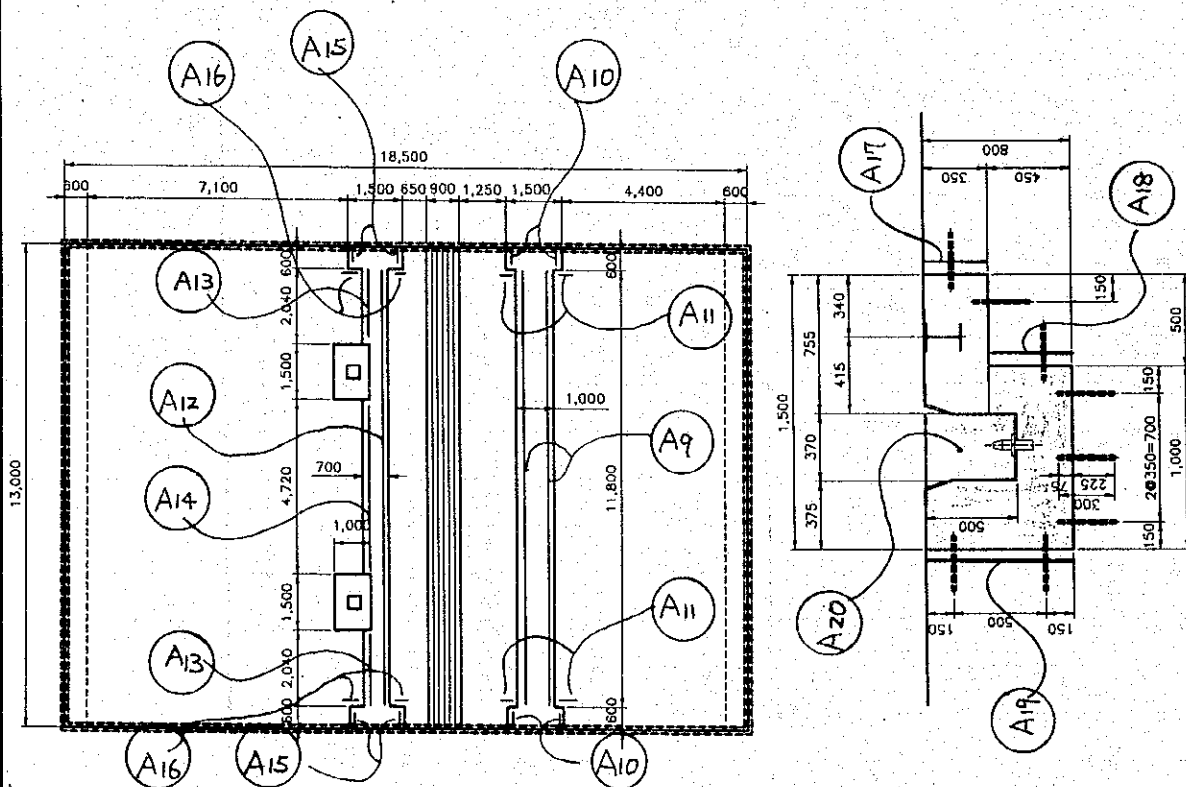
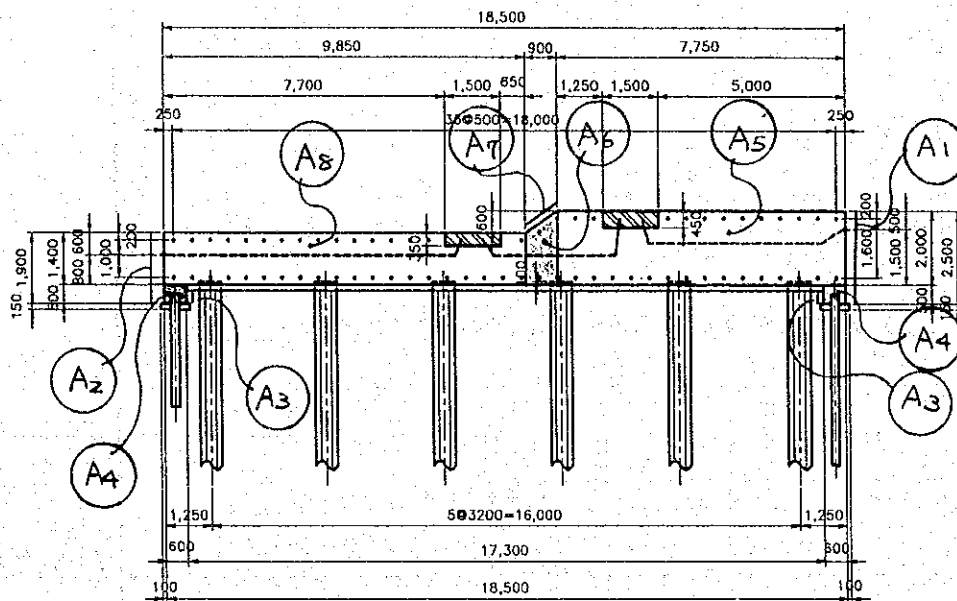
GATE FLOOR SLAB  
FORM

(2/2)

CALCULATION		RESULT
$A_{17} = 0.35 \times 1.50 \times 2$	$= 1.050$	
$A_{18} = 0.45 \times 1.50 \times 2$	$= 1.350$	
$A_{19} = 0.80 \times 1.50 \times 2$	$= 2.400$	
$A_{20} = \{(1.00 \times 0.45) + (0.35 \times 0.745)\} \times 2 \times 2$		
	$= 2.843$	
TOTAL = 138.985		138.985 m <sup>2</sup>

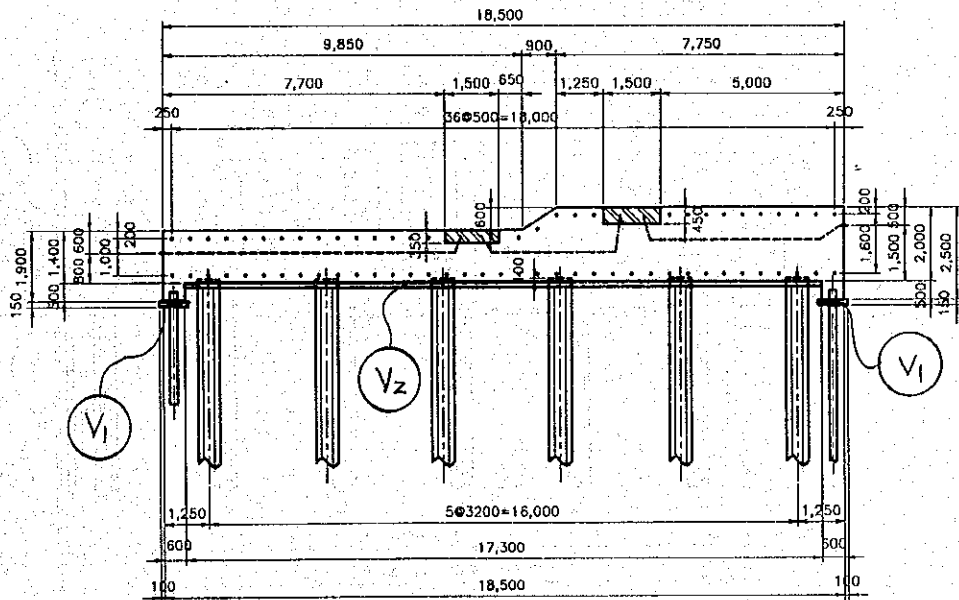
TYPE OF WORK : GATE FLOOR SLAB FORM  
 LOCATION :

EXPLANATORY DRAWING



# GATE FLOOR SLAB

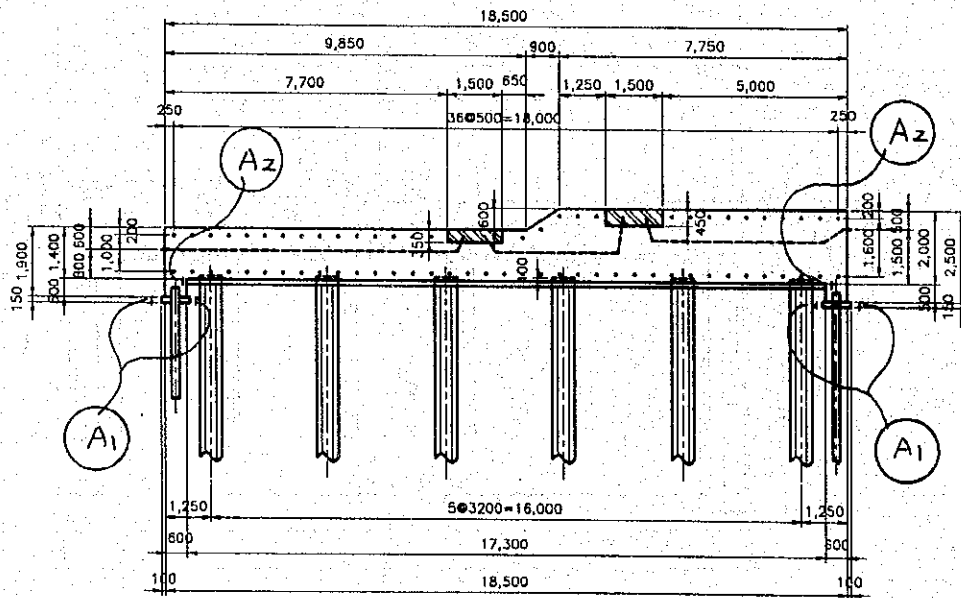
TYPE OF WORK:	CALCULATION	RESULT
LEVELING CONCRETE	(TYPE - E)	
LOCATION :	$V_1 = 0.80 \times 0.15 \times 13.00 \times 2 = 3.120$	
	$V_2 = 13.00 \times 17.30 \times 0.15 = 33.735$	
	(Deduction for PC Pile)	
	$V_3 = -\frac{\pi}{4} \times 0.60^2 \times 0.15 \times 30 \text{ piles} = -1.272$	
	(Deduction for PC Sheet Pile)	
	$V_4 = -0.22 \times 0.15 \times 13.00 = -0.429$	
	<b>TOTAL = 35.154</b>	<b>35.154 m<sup>3</sup></b>



GATE FLOOR SLAB

FORM OF LEVELING CONCRETE

TYPE OF WORK :	CALCULATION	RESULT
LOCATION :	(H < 4.0m)	
	$A_1 = 13.00 \times 0.15 \times 2 \times 2 = 7.800$	
	$A_2 = 13.00 \times 0.15 \times 2 = 3.900$	
	$A_3 = 0.80 \times 0.15 \times 2 = 0.240$	
	$A_4 = 17.30 \times 0.15 = 2.595$	
	TOTAL = 14.535	14.535 m <sup>2</sup>



TYPE OF WORK

GATE FLOOR SLAB  
SECONDARY CONCRETE (TYPE-C3)

LOCATION

CALCULATION	RESULT
(TYPE - C3)	
$V_1 = \{ (0.60 \times 1.50) \times 2 + (11.80 \times 1.00) \} \times 0.45 = 6.120$	
$V_2 = \{ (0.60 \times 1.50) + 2.04 \} \times 0.35 \times 2 = 2.058$	
$V_3 = 4.72 \times 0.35 = 1.652$	
$V_4 = \{ \{ (1.50 \times 0.35) + (1.00 \times 0.45) \} \times 1.50 - (0.37 \times 0.37 \times 0.50) \} \times 2 = 2.788$	
TOTAL = 12.618	12.618 m <sup>3</sup>

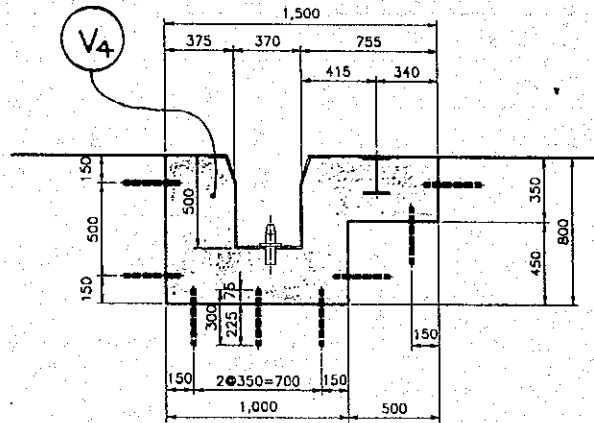
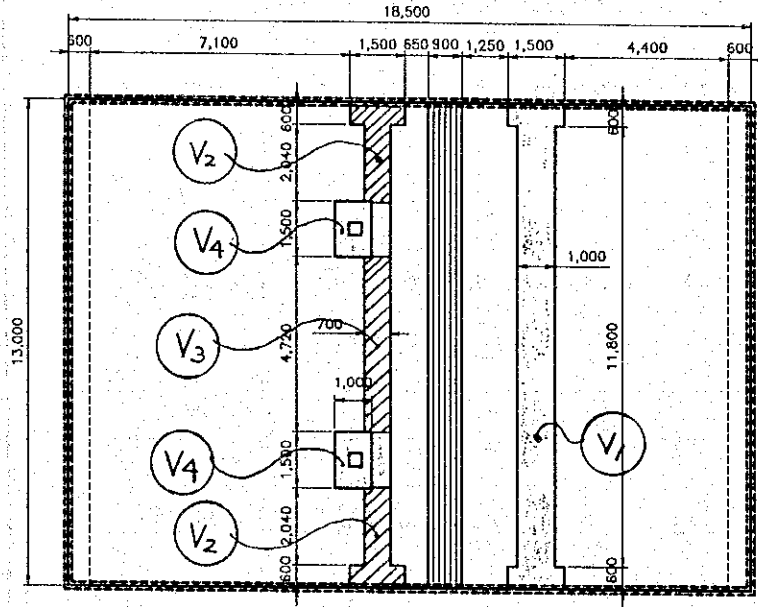


TYPE OF WORK

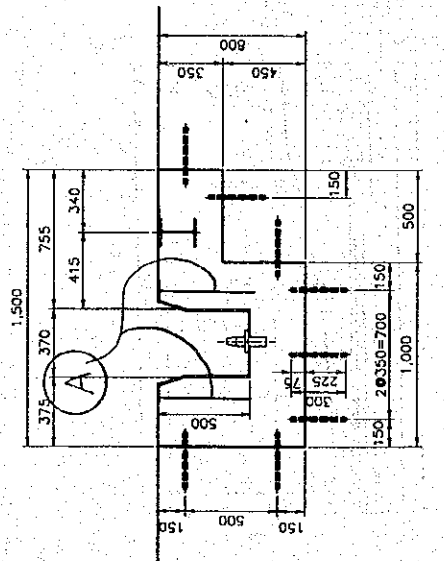
GATE FLOOR SLAB  
SECONDARY CONCRETE

LOCATION

EXPLANATORY DRAWING



GATE FLOOR SLAB

TYPE OF WORK :	FORM OF SECONDARY CONCRETE	CALCULATION	RESULT
LOCATION :		<p>(H &lt; 4.0m)</p> <p><math>A = 0.37 \times 0.50 \times 4 \times 2 = 1.480</math></p>	1.480 m <sup>2</sup>



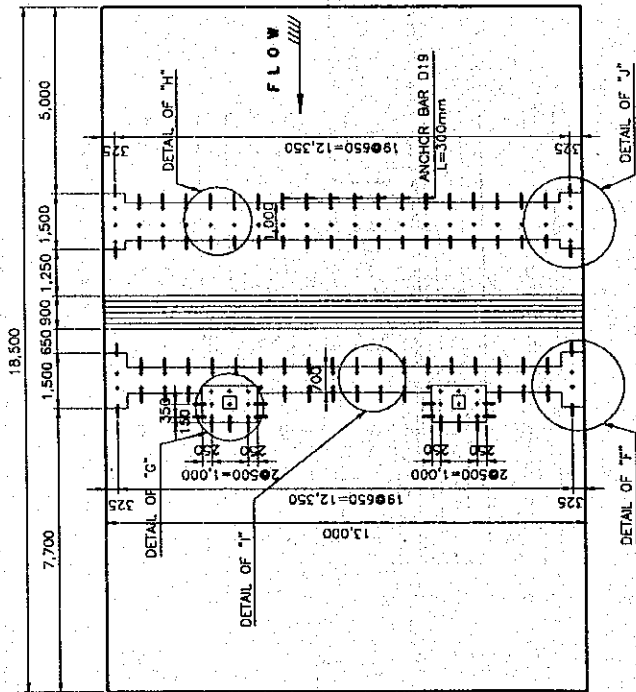
### GATE FLOOR SLABS

TYPE OF WORK :	DOVEL BAR	CALCULATION	RESULT
LOCATION :			
		REINFORCING BAR $\phi 19$ , $L = 1.24 \text{ m/Bar}$	
		$(W = 2.23 \text{ kg/m})$	
		$N = 26 \times 2 \times 2 = 104 \text{ Bars}$	
		$W = 104 \text{ Bars} \times 1.24 \times 2.23 = 287.581 \text{ kg}$	$0.288 \text{ tf}$
		PVC PIPE $\phi 25$ , $L = 0.55 \text{ m/pipe}$	
		$L = 104 \text{ pipes} \times 0.55 = 57.200$	$57.200 \text{ m}$

GATE FLOOR SLAB  
ANCHOR BAR

TYPE OF WORK:

LOCATION:



CALCULATION

(Section of Flood Discharge Gate)

$$N_1 = 18 \times 4 + 2 \times 5 = 82 \text{ Bars}$$

$$D19 (w = 2.23 \text{ kg/m}), L = 0.30 \text{ m}$$

$$W_1 = 82 \times 0.30 \times 2.23 = 54.858$$

(Section of Temporary Gate)

$$N_2 = 18 \times 2 + 12 \times 2 + 2 + (6 \times 3 + 2 \times 4) \times 2$$

$$= 114 \text{ Bars}$$

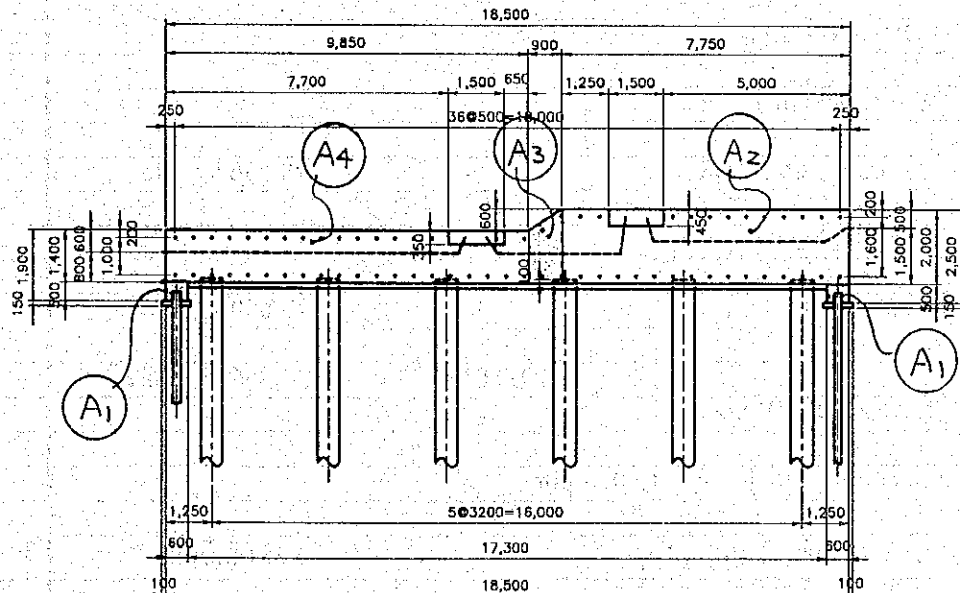
$$W_2 = 114 \times 0.30 \times 2.23 = 76.266$$

$$\text{TOTAL} = 131.124 \text{ kg}$$

0.131 tf

GATE FLOOR SLAB

TYPE OF WORK	CALCULATION	RESULT
JOINT FILLER	JOINT FILLER t=10 (ELASTIC MATERIAL)	
LOCATION		
	$A_1 = (0.50 \times 0.60) \times 2 \times 2 = 1.200$	
	$A_2 = 7.75 \times 2.00 \times 2 = 31.000$	
	$A_3 = (2.00 + 1.40) \times \frac{1}{2} \times 0.90 \times 2 = 3.060$	
	$A_4 = 9.85 \times 1.40 \times 2 = 27.580$	
	(Deduction for PC Sheet Pile)	
	$A_5 = -(0.22 \times 0.25) \times 2 = -0.110$	
	(Deduction for Blockout)	
	$A_6 = -\{(1.50 \times 0.45) + (1.50 \times 0.35)\} \times 2$	
	$= -2.400$	
	TOTAL = 60.330	60.330 m <sup>2</sup>



TYPE OF WORK : PILE HEAD TREATMENT  
 LOCATION : GATE FOR SLAB  
 : No. 1 (LEFT BANK)

CALCULATION	RESULT
<b>PC PILE DIA 600 (A) n = 30 PILES</b>	
LENGTH OF DESIGN : $L_1 = 10.40$ m	
SPARE PILE LENGTH : $L_2 = 1.00$ m	
Therefore, ADOPTED PILE LENGTH :	
$L = 10.40 + 1.00 = 11.40$ 12.00 m/pile	30 places
<b>PILING</b>	
N VALUE : N = 23 (Average)	
D = 10.40 m/pile	30 places
<b>CONCRETE FILLING (TYPE-C1) n = 30 PILES</b>	
$V = \frac{\pi}{4} \times 0.40^2 \times 1.15 = 0.144$ m <sup>3</sup> /pile	30 places
<b>SUSPENDED FORM</b>	
$A = \frac{\pi}{4} \times 0.40^2 = 0.126$ m <sup>3</sup> /pile	30 places
<b>REINFORCING BAR</b>	
D 16 (W = 1.58 kg/m)	
$W_1 = 8 \text{ Bars} \times 1.65 \times 1.58 = 20.856$ kg/pile	
D 13 (W = 1.04 kg/m)	
$W_2 = 10 \text{ Bars} \times 1.25 \times 1.04 = 13.000$ kg/pile	
TOTAL = 33.856 kg.f/pile	30 places
<b>CUTTING PILE HEAD</b>	
Height of cutting : h = 1.60 m/pile	
$V = \frac{\pi}{4} \times (0.60^2 - 0.40^2) \times 1.60 = 0.251$ m <sup>3</sup> /pile	30 places

TYPE OF WORK : PILE HEAD TREATMENT  
 LOCATION : GATE FOR SLAB  
 : No. 2 to No. 3

CALCULATION	RESULT
<b>PC PILE DIA 600 (A) n = 30 PILES</b>	
LENGTH OF DESIGN : $L_1 = 10.50$ m	
SPARE PILE LENGTH : $L_2 = 1.00$ m	
Therefore, ADOPTED PILE LENGTH :	
$L = 10.50 + 1.00 = 11.50$ 12.00 m/pile	30 places
<b>PILING</b>	
N VALUE : $N = 23$ (Average)	
$D = 10.50$ m/pile	30 places
<b>CONCRETE FILLING (TYPE-C1) n = 30 PILES</b>	
$V = \frac{\pi}{4} \times 0.40^2 \times 1.15 = 0.144$ m <sup>3</sup> /pile	30 places
<b>SUSPENDED FORM</b>	
$A = \frac{\pi}{4} \times 0.40^2 = 0.126$ m <sup>3</sup> /pile	30 places
<b>REINFORCING BAR</b>	
D 16 (W = 1.58 kg/m)	
$W_1 = 8 \text{ Bars} \times 1.65 \times 1.58 = 20.856$ kg/pile	
D 13 (W = 1.04 kg/m)	
$W_2 = 10 \text{ Bars} \times 1.25 \times 1.04 = 13.000$ kg/pile	
<b>TOTAL</b> = 33.856 kg.f/pile	30 places
<b>CUTTING PILE HEAD</b>	
Height of cutting : $h = 1.50$ m/pile	
$V = \frac{\pi}{4} \times (0.60^2 - 0.40^2) \times 1.50 = 0.236$ m <sup>3</sup> /pile	30 places



3.2.4 Concrete Apron  
CONCRETE APRON (EL+1.500)  
CONCRETE (TYPE-CI)

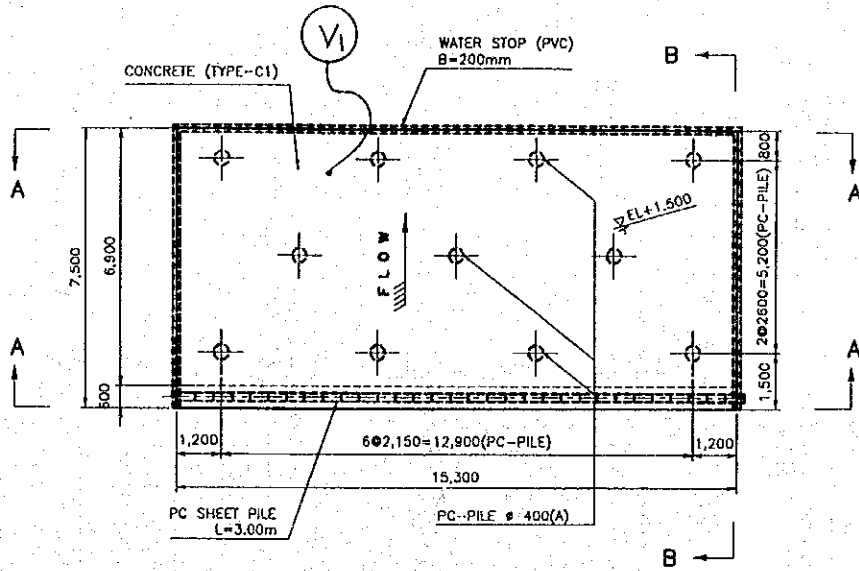
TYPE OF WORK  
LOCATION

CALCULATION	RESULT
(TYPE-CI)	
$V_1 = 1.00 \times 7.50 \times 15.30 = 114.750$	
$V_2 = 0.60 \times 0.50 \times 15.30 = 4.590$	
(Deduction for PC Sheet Pile)	
$V_3 = -(0.22 \times 0.25 \times 15.30) = -0.842$	
(Deduction for PC Pile)	
$V_4 = -(\frac{1}{4} \times 0.40^2 \times 0.10 \times 11 \text{ piles}) = -0.138$	
TOTAL = 118.360	118.360 m <sup>3</sup>

TYPE OF WORK  
LOCATION

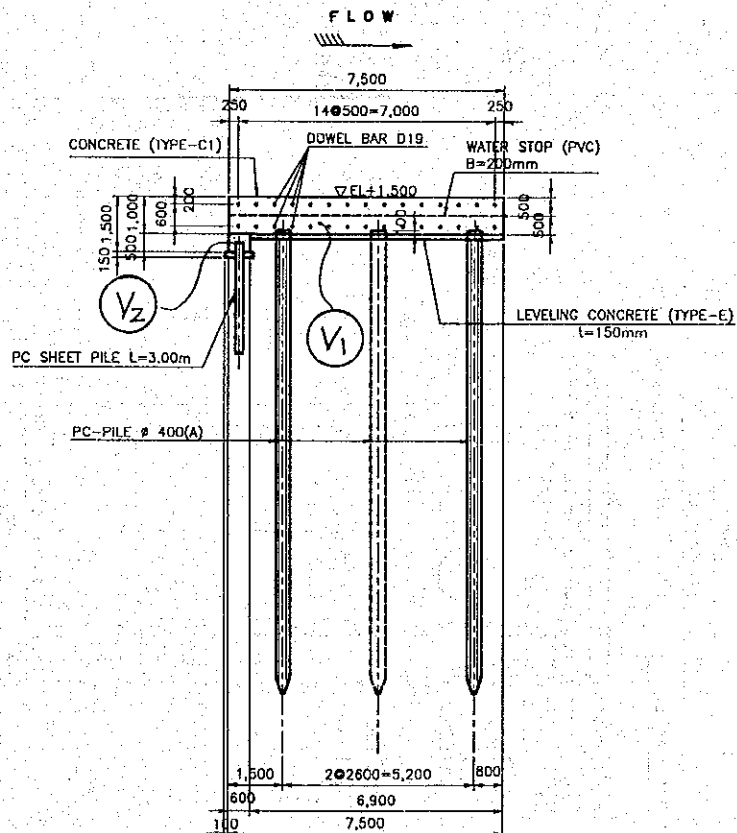
CONCRETE APRON (EL+1.500)  
CONCRETE (TYPE-C1)

EXPLANATORY DRAWING



PLAN

SCALE A

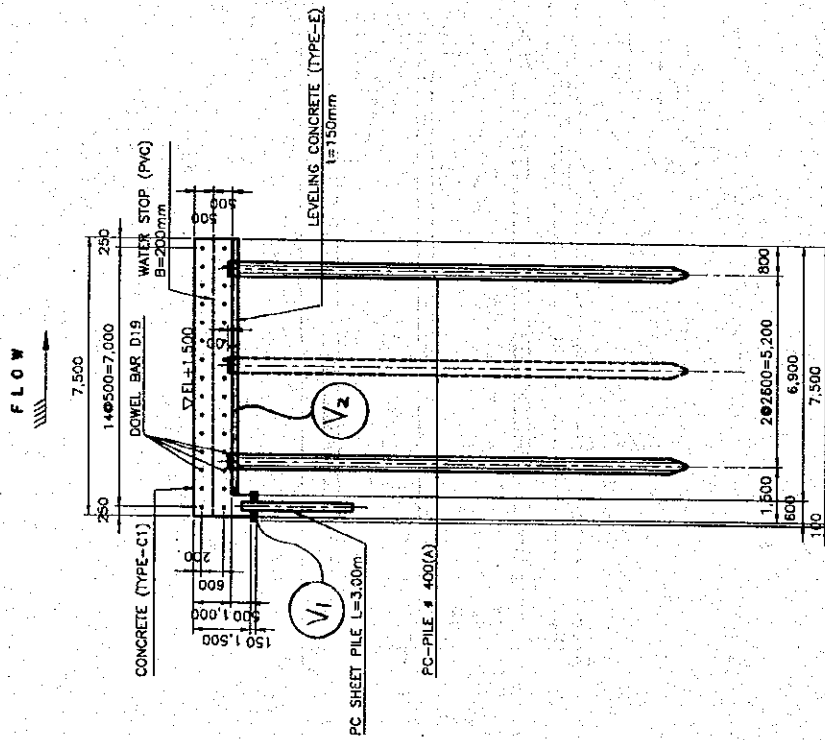


CONCRETE APRON (EL+1.500)

LEVELLING CONCRETE

TYPE OF WORK :

LOCATION :



RESULT	CALCULATION
	(TYPE-E)
	$V_1 = 0.15 \times 0.80 \times 15.30 = 1.836$
	$V_2 = 0.15 \times 6.90 \times 15.30 = 15.836$
	(Deduction for PC Sheet Pile)
	$V_3 = - (0.22 \times 0.15 \times 15.30) = -0.505$
	(Deduction for PC Pile)
	$V_4 = - (\frac{\pi}{4} \times 0.40^2 \times 0.15 \times 11 \text{ piles}) = -0.207$
	TOTAL = 16.960
	16.960 m <sup>3</sup>

TYPE OF WORK  
LOCATION

CONCRETE APRON (EL+1.500)  
FORM

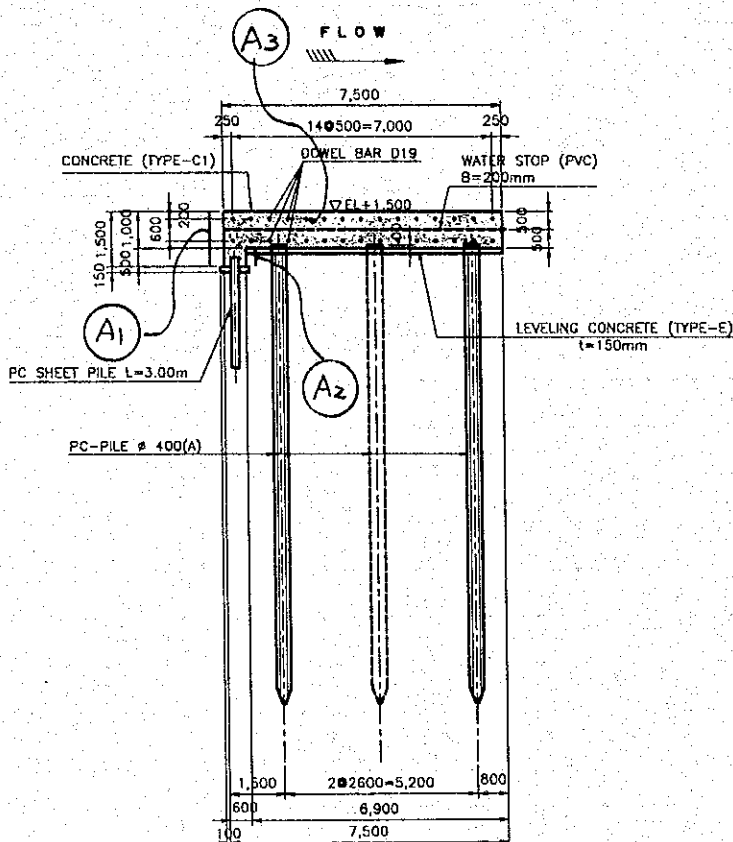
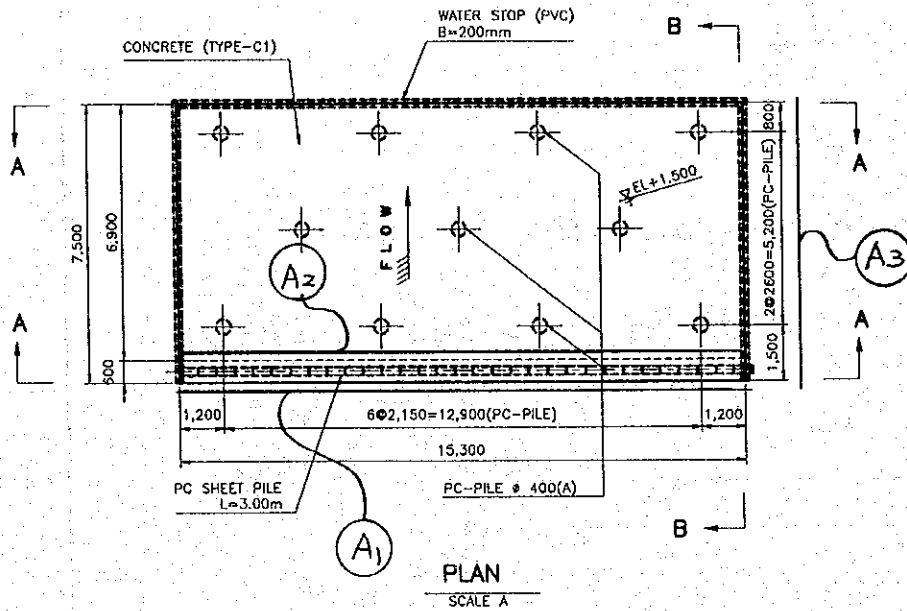
CALCULATION	RESULT
(H < 4.0m)	
$A_1 = 1.50 \times 15.30$	
$A_2 = 0.35 \times 15.30$	
$A_3 = (1.00 \times 7.50) + (0.60 \times 0.50 - 0.22 \times 0.25)$	
$TOTAL = 36.050$	$36.050 \text{ m}^2$

TYPE OF WORK

CONCRETE APRON (EL+1.500)  
FORM

LOCATION

EXPLANATORY DRAWING

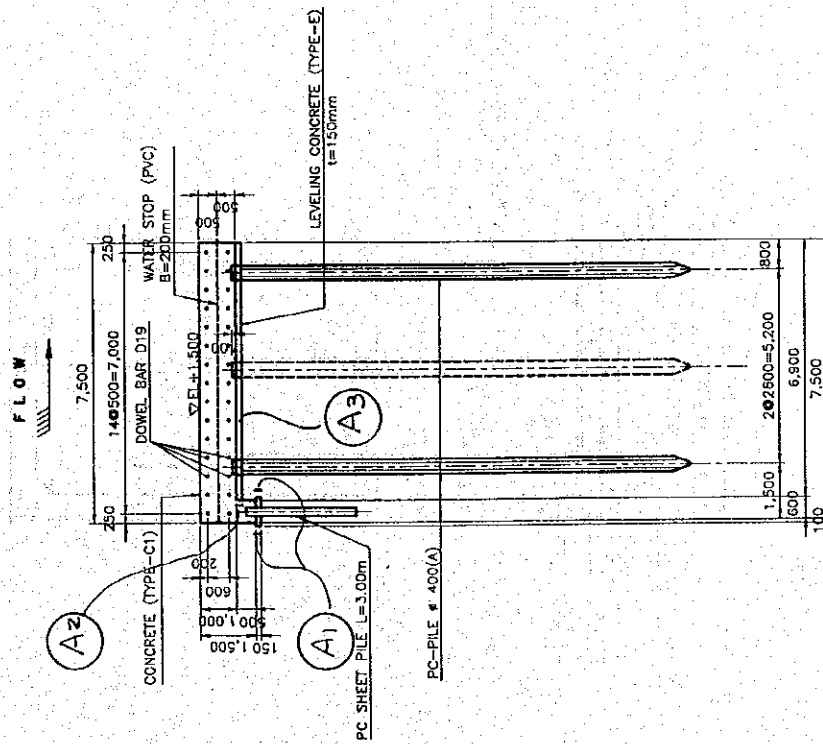


CONCRETE APRON (EL+1.500)

FORM OF LEVELING CONCRETE

TYPE OF WORK :

LOCATION :



CALCULATION	RESULT
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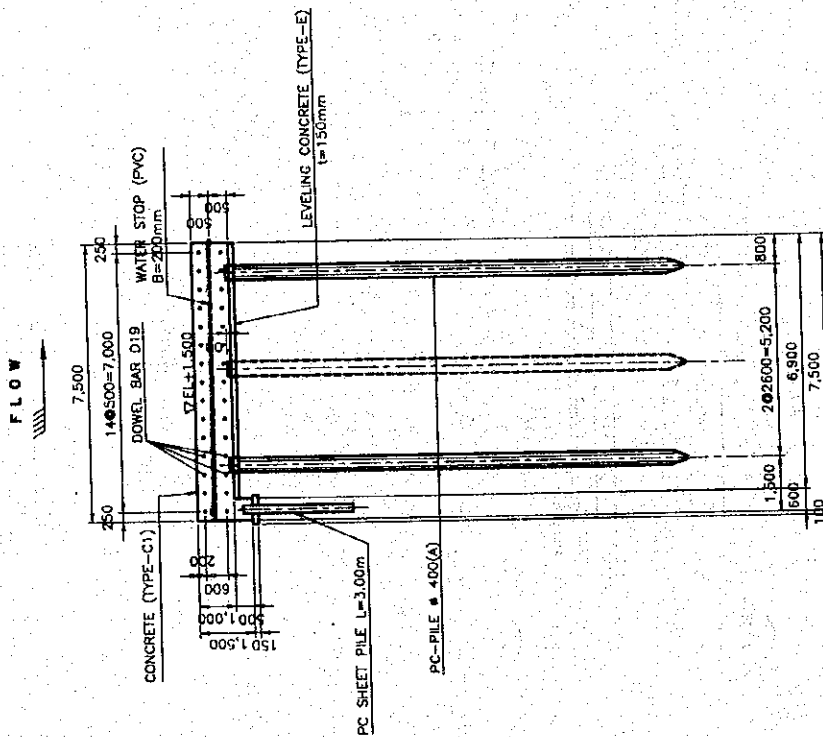
(H) < 4.0m)	
$A_1 = 0.15 \times 15.30 \times 2 = 4.590$	
$A_2 = 0.15 \times 15.30 = 2.295$	
$A_3 = (0.15 \times 6.90) + (0.15 \times 0.80 - 0.22 \times 0.15) = 1.122$	
<b>TOTAL = 8.007</b>	<b>8.007 m<sup>2</sup></b>

CONCRETE APPROX (EL+1.500)

TYPE OF WORK :

WATER STOP

LOCATION :



CALCULATION

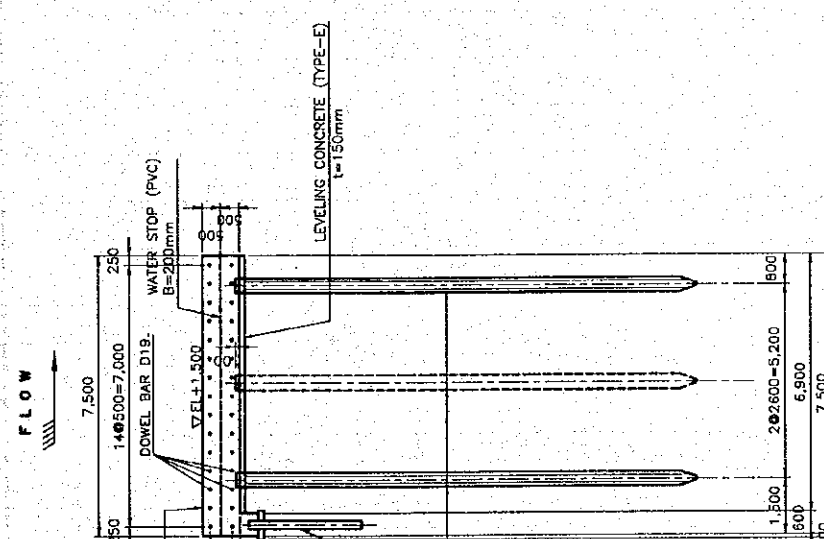
B = 200 mm

L = 7.500

RESULT

7.500 m

CONCRETE APRON (EL+1.500)

TYPE OF WORK: LOCATION:	DOWEL BAR	CALCULATION	RESULT
	 <p>             FLOW →              7,500              250              14#500=7,000              DOWEL BAR D19              WATER STOP (PVC)              B=200mm              LEVELING CONCRETE (TYPE-E)              t=150mm              CONCRETE (TYPE-C1)              150, 1,500              500, 1,000              600              200              2,600=5,200              800              1,500              6,900              7,500              140              PC SHEET PILE L=3.00m              PC-PILE ϕ 400(A)         </p>	<ul style="list-style-type: none"> <li>Reinforcing Bar : ϕ19 , L = 1.24m/Bar</li> <li><math>n_1 = 15 \times 2 = 30 \text{ Bars}</math></li> <li><math>\phi 19 : w = 2.23 \text{ kg/m}</math></li> <li><math>w = 30 \text{ Bars} \times 1.24 \times 2.23 = 82.956</math></li> <li>PVC Pipe : ϕ25 , L = 0.55m/pipe</li> <li>n = 30 pipes</li> <li><math>L = 30 \text{ pipes} \times 0.55 = 16.500</math></li> </ul>	<p>82.956 kg</p> <p>16.500 m</p>



TYPE OF WORK  
LOCATION

CONCRETE APRON (EL+1.500)  
JOINT FILLER

CALCULATION	RESULT
$t = 10$ (ELASTIC MATERIAL)	
$A_1 = 1.00 \times 15.30$	
$A_2 = (1.00 \times 7.50) + (0.60 \times 0.50 - 0.22 \times 0.25)$	

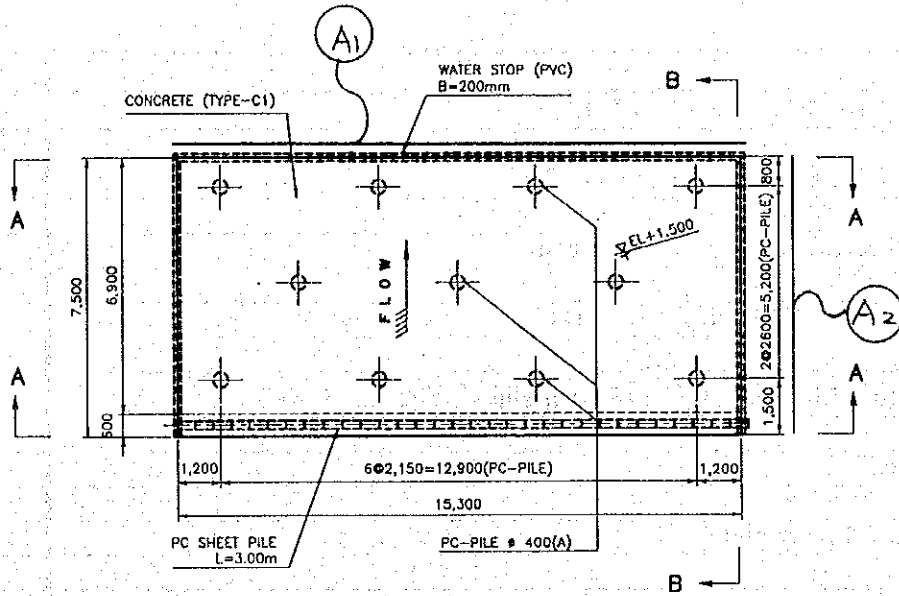
TYPE OF WORK

CONCRETE APRON (EL+1.500)

LOCATION

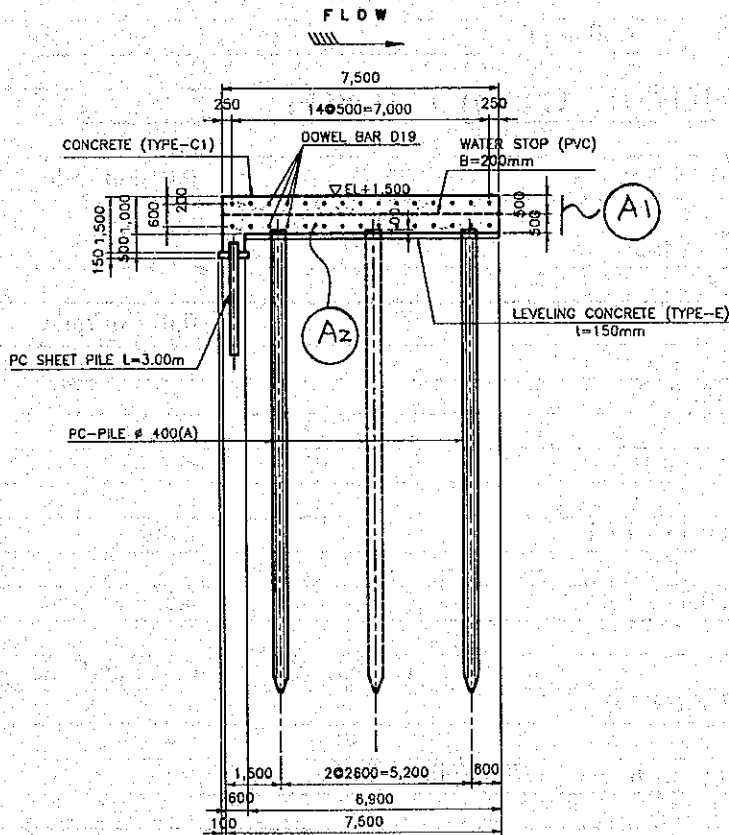
JOINT FILLER

EXPLANATORY DRAWING



PLAN

SCALE A



TYPE OF WORK : PILE HEAD TREATMENT  
 LOCATION : CONCRETE APRON (EL. +1.500)  
 : No. 1 (LEFT BANK)

CALCULATION	RESULT
<b>PC PILE DIA 400 (A) n = 11 PILES</b>	
LENGTH OF DESIGN : $L_1 = 11.30$ m	
SPARE PILE LENGTH : $L_2 = 1.00$ m	
Therefore, ADOPTED PILE LENGTH :	
$L = 11.30 + 1.00 = 12.30$ 13.00 m/pile	11 places
<b>JOINTING</b>	
$n = 1$ place/pile	11 places
<b>PILING</b>	
N VALUE : $N = 32$ (Average)	
$D = 11.30$ m/pile	11 places
<b>CONCRETE FILLING (TYPE-C1) n = 11 PILES</b>	
$V = \frac{\pi}{4} \times 0.19^2 \times 0.55 = 0.016$ m <sup>3</sup> /pile	11 places
<b>SUSPENDED FORM</b>	
$A = \frac{\pi}{4} \times 0.19^2 = 0.028$ m <sup>3</sup> /pile	11 places
<b>REINFORCING BAR</b>	
D 13 (W = 1.04 kg/m)	
$W_1 = 6 \text{ Bars} \times 0.45 \times 1.04 = 2.808$	
$W_2 = 4 \text{ Bars} \times 0.85 \times 1.04 = 3.536$	
<b>TOTAL W = 6.344 kg.f/pile</b>	11 places
<b>CUTTING PILE HEAD</b>	
Height of cutting : $h = 1.70$ m/pile	
$V = \frac{\pi}{4} \times (0.40^2 - 0.19^2) \times 1.70 = 0.165$ m <sup>3</sup> /pile	11 places

TYPE OF WORK : PILE HEAD TREATMENT  
 LOCATION : CONCRETE APRON (EL. +1.500)  
 : No. 2 to No. 5

CALCULATION	RESULT
<b>PC PILE DIA 400 (A) n = 11 PILES</b>	
LENGTH OF DESIGN : $L_1 = 11.40$ m	
SPARE PILE LENGTH : $L_2 = 1.00$ m	
Therefore, ADOPTED PILE LENGTH :	
$L = 11.40 + 1.00 = 12.40$ 13.00 m/pile	11 places
<b>JOINTING</b>	
$n = 1$ place/pile	11 places
<b>PILING</b>	
N VALUE : $N = 22$ (Average)	
$D = 11.40$ m/pile	11 places
<b>CONCRETE FILLING (TYPE-C1) n = 11 PILES</b>	
$V = \frac{\pi}{4} \times 0.19^2 \times 0.55 = 0.016$ m <sup>3</sup> /pile	11 places
<b>SUSPENDED FORM</b>	
$A = \frac{\pi}{4} \times 0.19^2 = 0.028$ m <sup>3</sup> /pile	11 places
<b>REINFORCING BAR</b>	
D 13 (W = 1.04 kg/m)	
$W_1 = 6$ Bars $\times 0.45 \times 1.04 = 2.808$	
$W_2 = 4$ Bars $\times 0.85 \times 1.04 = 3.536$	
TOTAL W = 6.344 kg./f/pile	11 places
<b>CUTTING PILE HEAD</b>	
Height of cutting : $h = 1.60$ m/pile	
$V = \frac{\pi}{4} \times (0.40^2 - 0.19^2) \times 1.60 = 0.156$ m <sup>3</sup> /pile	11 places

TYPE OF WORK  
LOCATION

CONCRETE APRON (EL+0.900)  
CONCRETE (TYPE-C1)  
END SECTION

CALCULATION	RESULT
(TYPE-C1)	
$V_1 = 1.20 \times 15.00 \times 15.30$	= 275.400
$V_2 = (1.10 + 0.50) \times \frac{1}{2} \times 0.60 \times (6.80 + 2.50 + 0.75 \times 4)$	= 5.904
$V_3 = 0.60 \times 0.50 \times 15.30$	= 4.590
$V_4 = 0.50 \times 0.60 \times 10.15$	= 3.045
(Deduction for PC Sheet Pile)	
$V_5 = - (0.22 \times 0.25 \times 15.30)$	= -0.842
(Deduction for PC Pile)	
$V_6 = - (\frac{\pi}{4} \times 0.45^2 \times 0.10 \times 20 \text{ piles})$	= -0.318
<b>TOTAL</b>	= 287.779
	287.779 m <sup>3</sup>

TYPE OF WORK

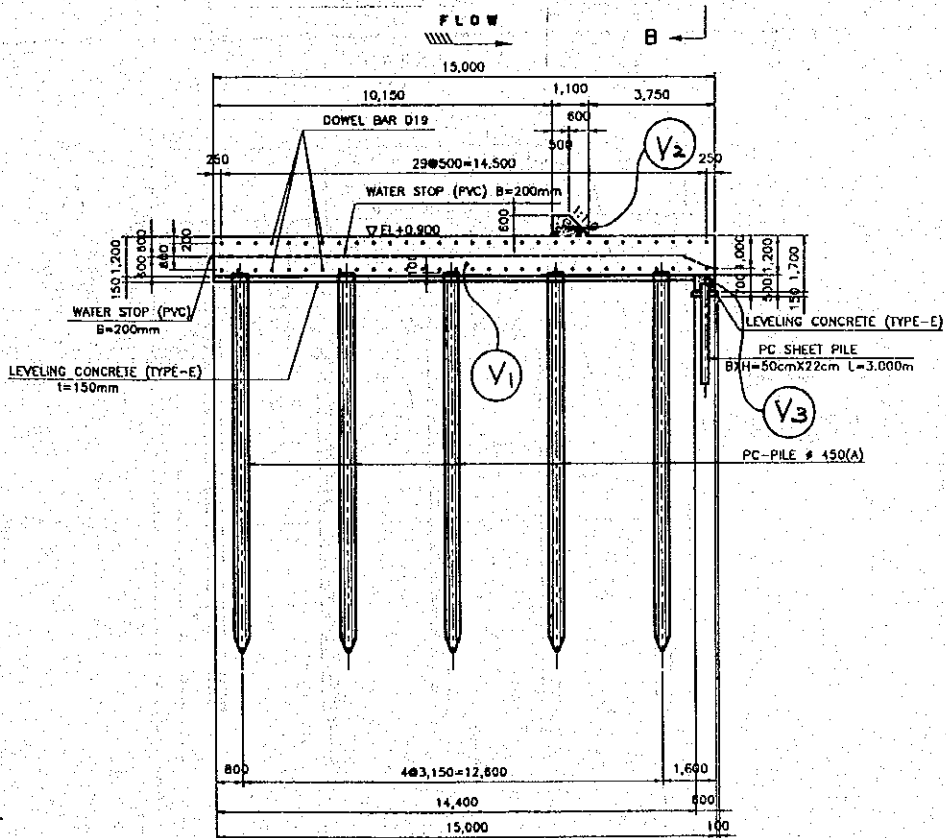
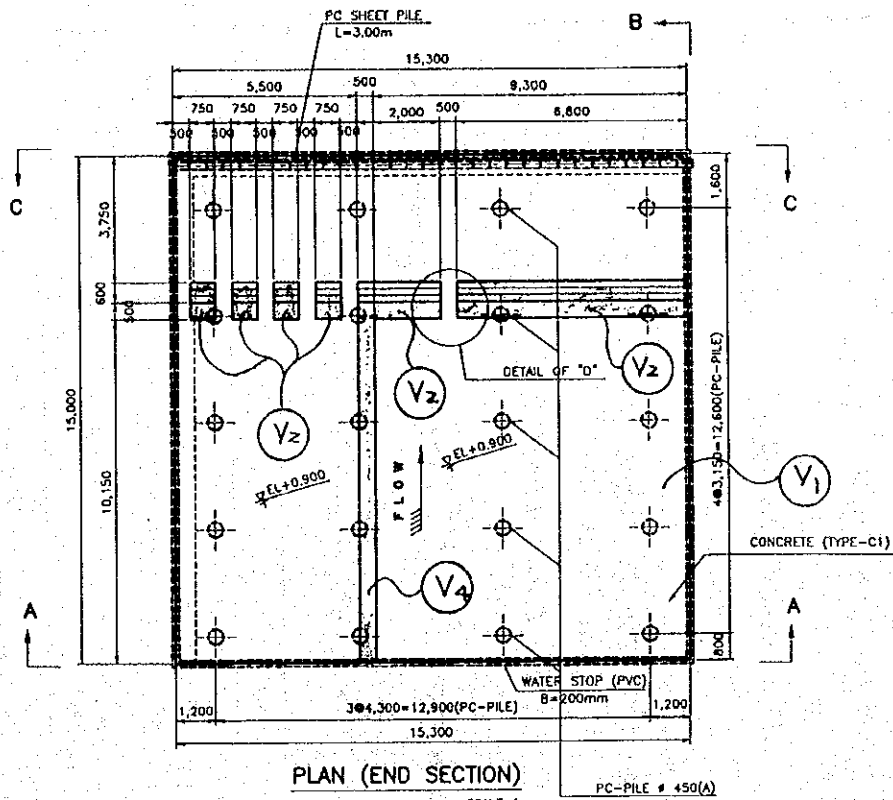
CONCRETE APRON (EL+0.900)

CONCRETE (TYPE-CI)

LOCATION

END SECTION

EXPLANATORY DRAWING



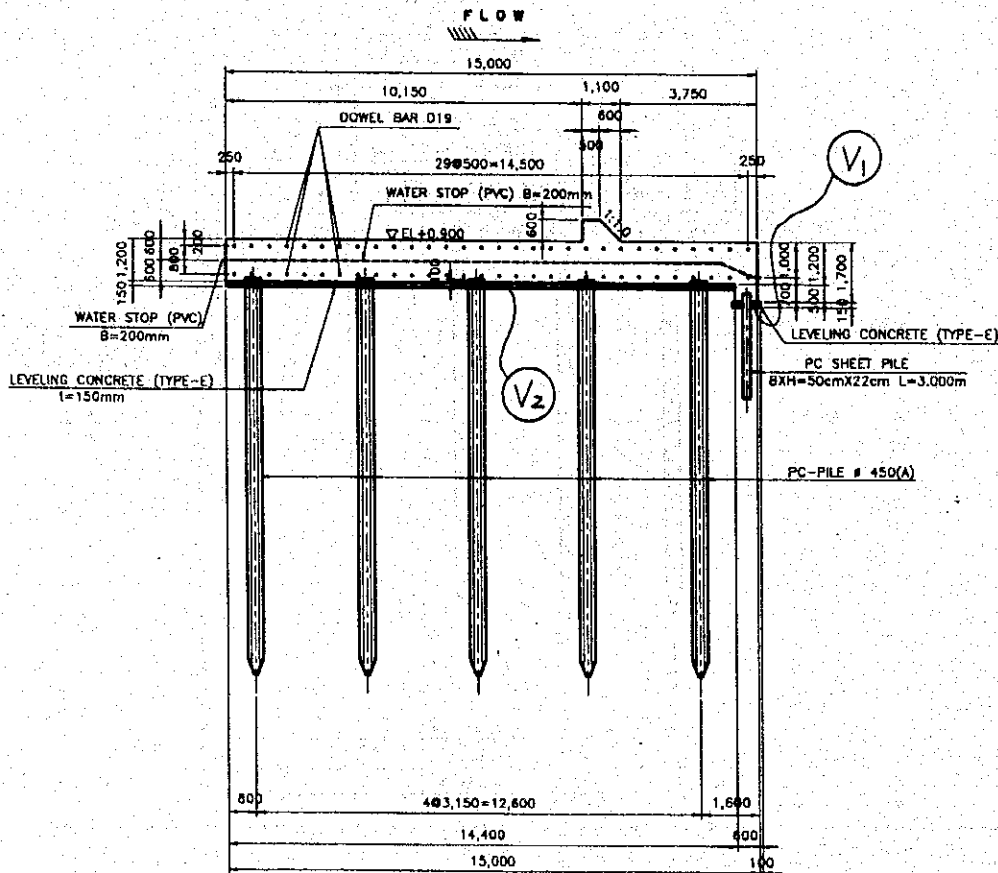
CONCRETE APRON (EL+0.900)

LEVELING CONCRETE

END SECTION

TYPE OF WORK :

LOCATION :



TYPE OF WORK :	CALCULATION	RESULT
LOCATION :	(TYPE-E)	
	$V_1 = 0.15 \times 0.80 \times 15.30$	$= 1.836$
	$V_2 = 0.15 \times 14.40 \times 15.30$	$= 33.048$
	(Deduction for PC Sheet Pile)	
	$V_3 = -(0.15 \times 0.22 \times 15.30)$	$= -0.505$
	(Deduction for PC Pile)	
	$V_4 = -\frac{1}{4} \times 0.45^2 \times 0.15 \times 20 \text{ piles}$	$= -0.477$
	TOTAL =	33.902 m <sup>3</sup>

TYPE OF WORK : CONCRETE APRON (EL +0.900)  
 : FORM  
 LOCATION : END SECTION

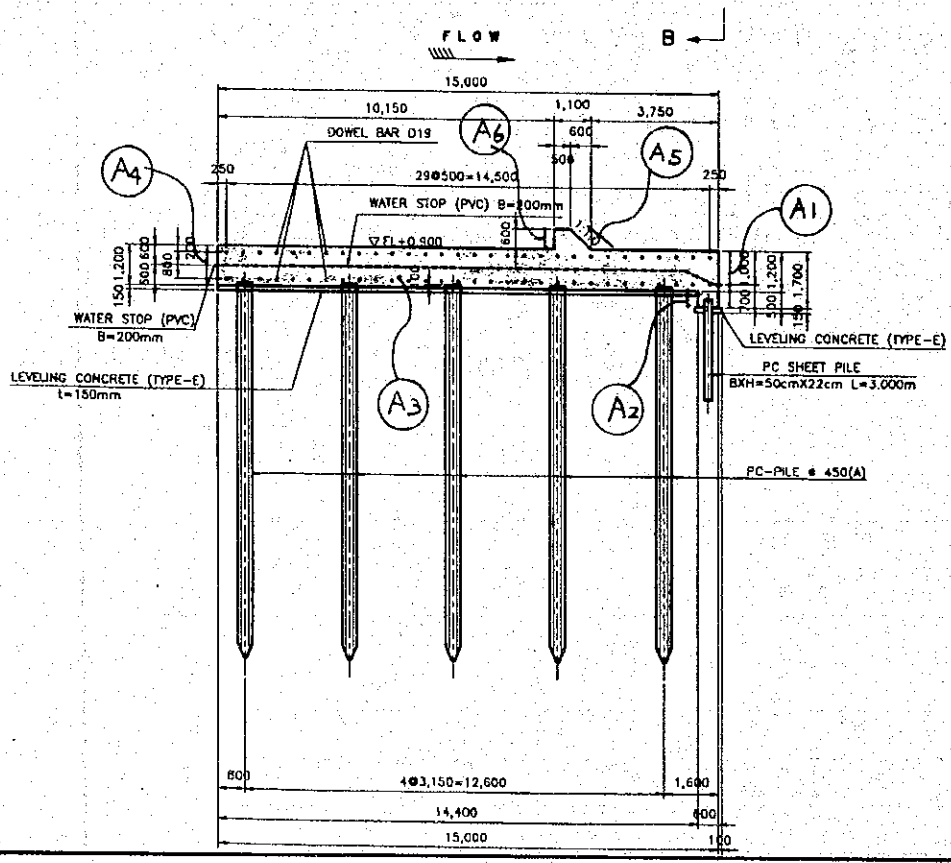
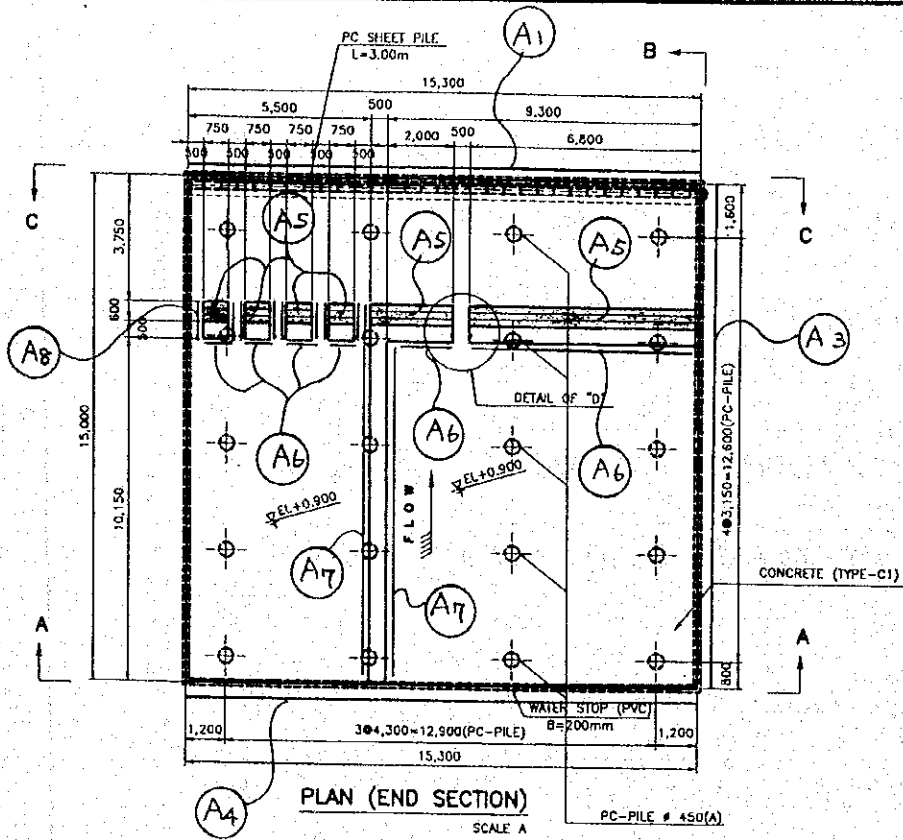
CALCULATION	RESULT
(H < 4.0m)	
$A_1 = 1.70 \times 15.30$	
= 26.010	
$A_2 = 0.35 \times 15.30$	
= 5.355	
$A_3 = \{ (0.60 \times 0.50) + (1.20 \times 15.00) + (1.10 + 0.50) \times \frac{1}{2} \times 0.60 \}$	
= 18.780	
<del><math>A_4 = (1.20 \times 15.30) + (0.60 \times 0.50)</math></del>	
<del>= 18.660</del>	
$A_5 = \sqrt{(0.60)^2 + (0.60)^2} \times (6.80 + 2.50 + 0.75 \times 4)$	
= 10.437	
$A_6 = 0.60 \times (6.80 + 2.00 + 0.75 \times 4)$	
= 7.080	
$A_7 = 0.60 \times 10.15 \times 2$	
= 12.180	
$A_8 = (1.10 + 0.50) \times \frac{1}{2} \times 0.60 \times 9$	
= 4.320	
(Deduction for PC Sheet Pile)	
$A_9 = - (0.22 \times 0.25)$	
= -0.055	
TOTAL = 84.107	84.107 m <sup>2</sup>



TYPE OF WORK  
LOCATION

CONCRETE APRON (EL+0.900)  
FORM  
END SECTION

EXPLANATORY DRAWING



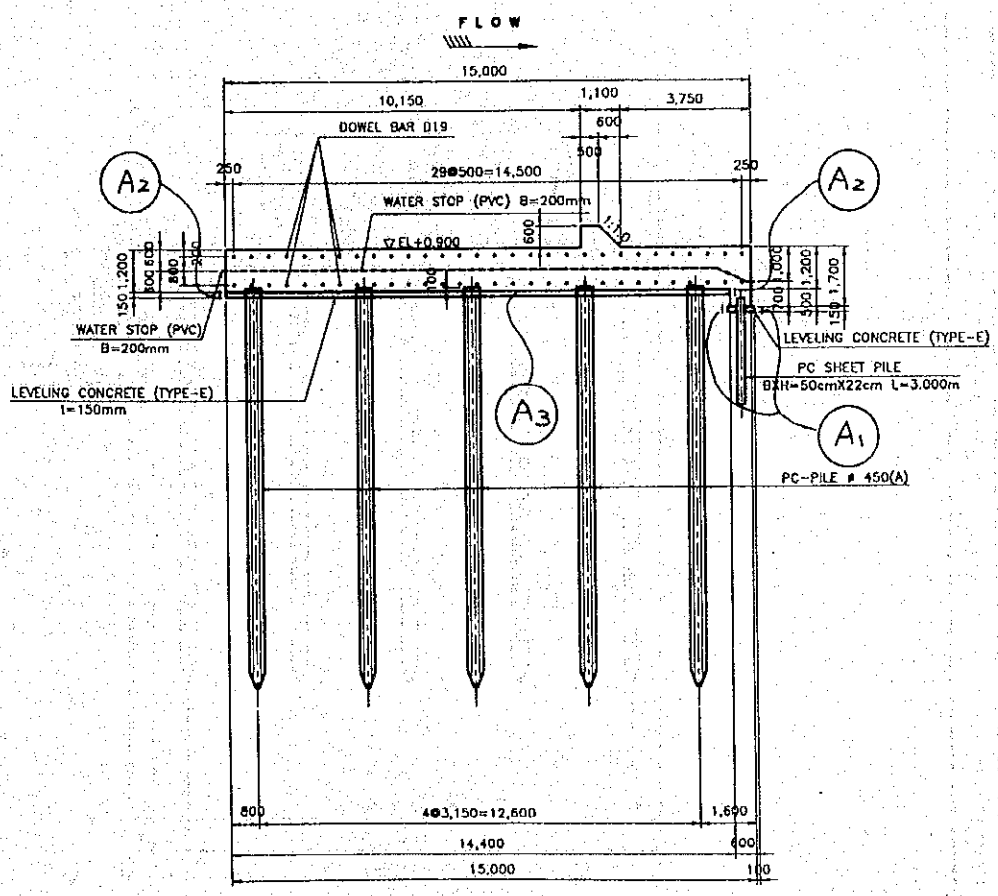
CONCRETE APRON (EL+0.900)

FORM OF LEVELING CONCRETE

END SECTION

TYPE OF WORK :

LOCATION :



TYPE OF WORK :	LOCATION :	CALCULATION	RESULT
		(H < 4.0 m)	
		$A_1 = 0.15 \times 15.30 \times 2 = 4.590$	
		$A_2 = 0.15 \times 15.30 \times 2 = 4.590$	
		$A_3 = (0.15 \times 14.40) + (0.15 \times 0.80 - 0.15 \times 0.22)$	
		$= 2.247$	
		TOTAL = 11.427	11.427 m <sup>2</sup>



TYPE OF WORK : CONCRETE APRON (EL+0.900)  
: DOWEL BAR  
LOCATION : END SECTION

CALCULATION	RESULT
• Reinforcing Bar : $\phi 19$ , $L = 1.24 \text{ m/bar}$	
$n_1 = 30 \times 2 = 60 \text{ Bars}$	
$n_2 = 30 \times 2 = 60 \text{ Bars}$	
$\phi 19 : w = 2.23 \text{ kg/m}$	
$W = 120 \text{ Bars} \times 1.24 \times 2.23 = 331.824$	331.824 kg
• PVC Pipe : $\phi 25$ , $L = 0.55 \text{ m/pipe}$	
$L = 120 \text{ pipes} \times 0.55 = 66.000$	66.000 m

TYPE OF WORK

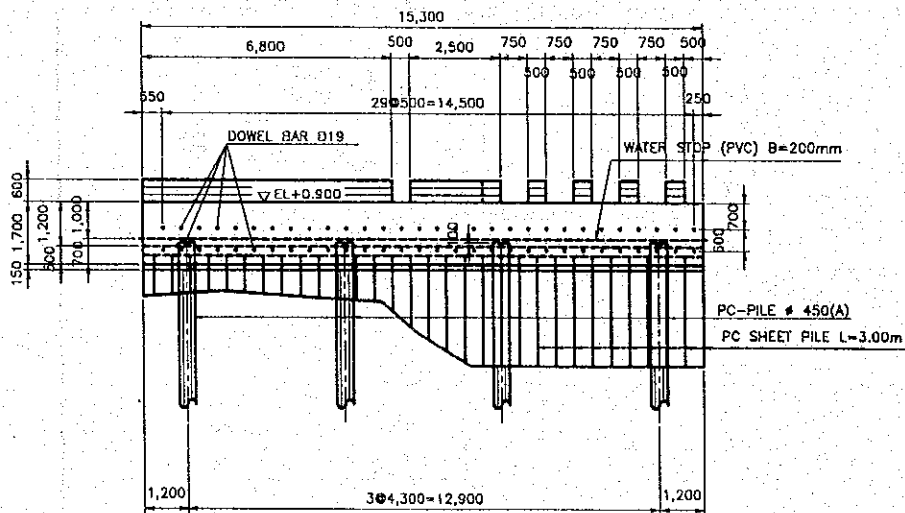
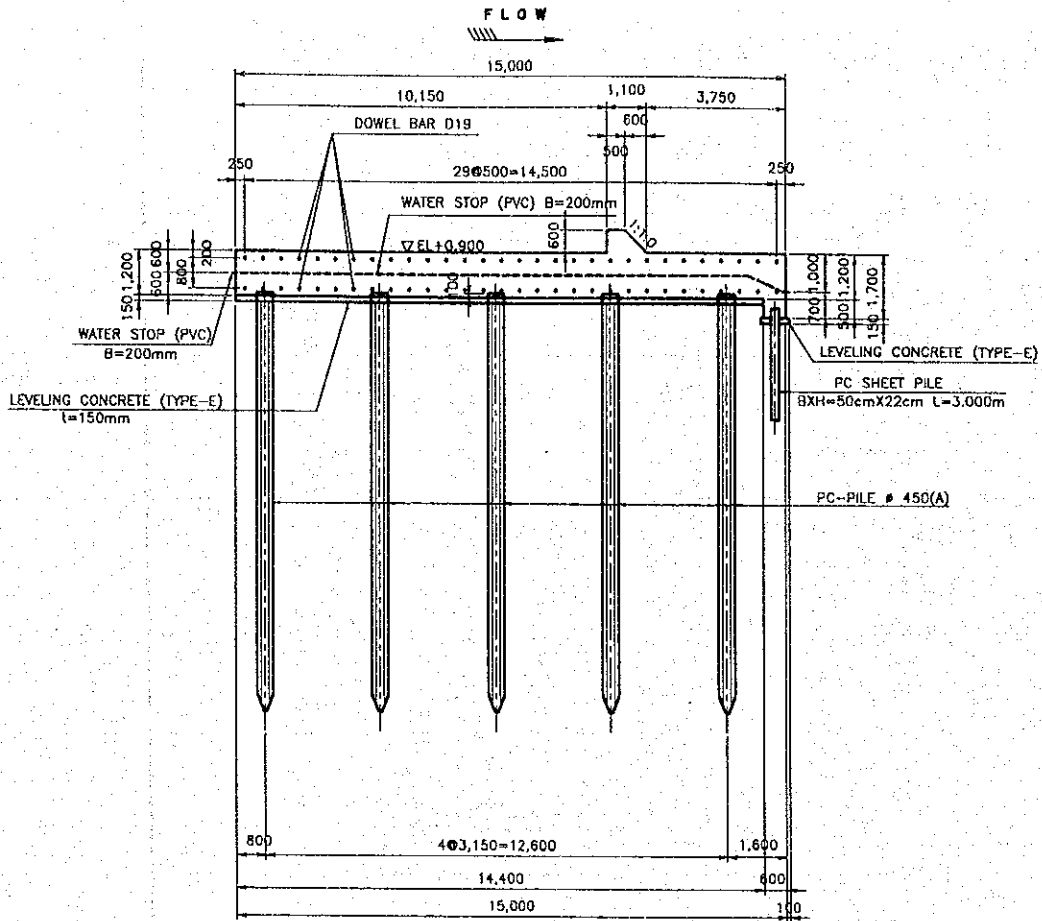
CONCRETE APRON (EL+0.900)

DOWEL BAR

LOCATION

END SECTION

EXPLANATORY DRAWING



SECTION C-C

SCALE A

CONCRETE APRON (EL+0.900)

TYPE OF WORK :

JOINT FILLER

LOCATION :

END SECTION

CALCULATION

t = 10 (ELASTIC MATERIAL)

$$A_1 = (0.60 \times 0.50) + (1.20 \times 15.00) + (1.10 + 0.50) \times \frac{1}{2} \times 0.60$$

$$= 18.780$$

$$A_2 = (0.60 \times 0.50) + (1.20 \times 15.00) = 18.300$$

$$A_3 = (1.20 \times 15.30) + (0.60 \times 0.50) = 18.660$$

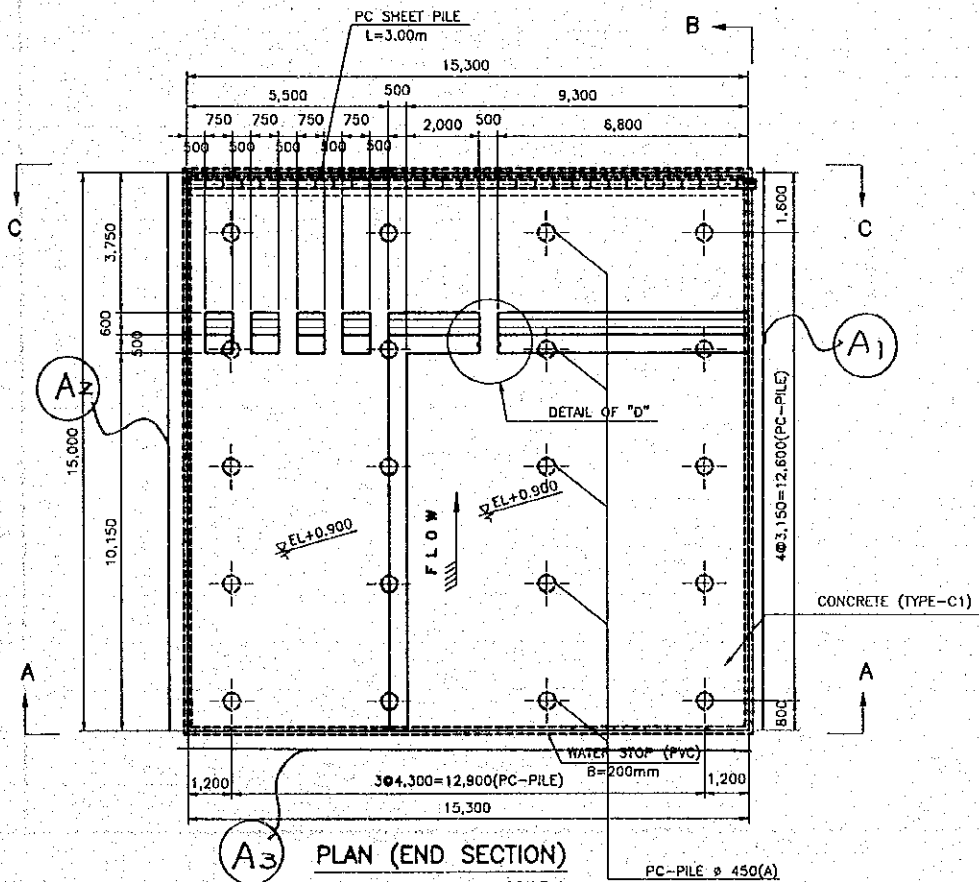
(Deduction for PC Sheet Pile)

$$A_4 = - (0.22 \times 0.25) = -0.055$$

$$\text{TOTAL} = 55.685$$

$$55.685 \text{ m}^2$$

PLAN (END SECTION)

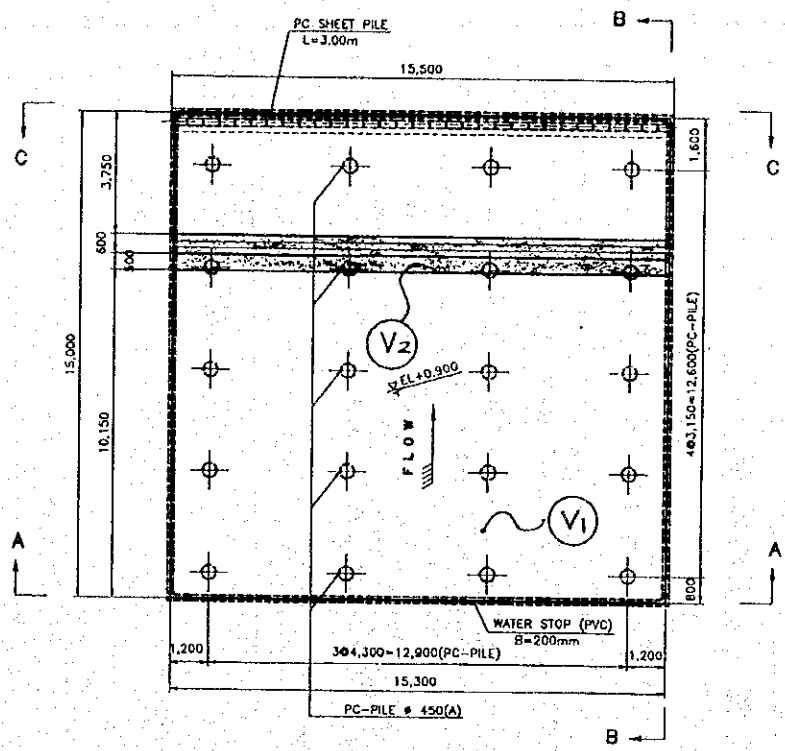


TYPE OF WORK : CONCRETE APRON (EL+0.900)  
CONCRETE (TYPE-C1)  
LOCATION : MIDDLE SECTION

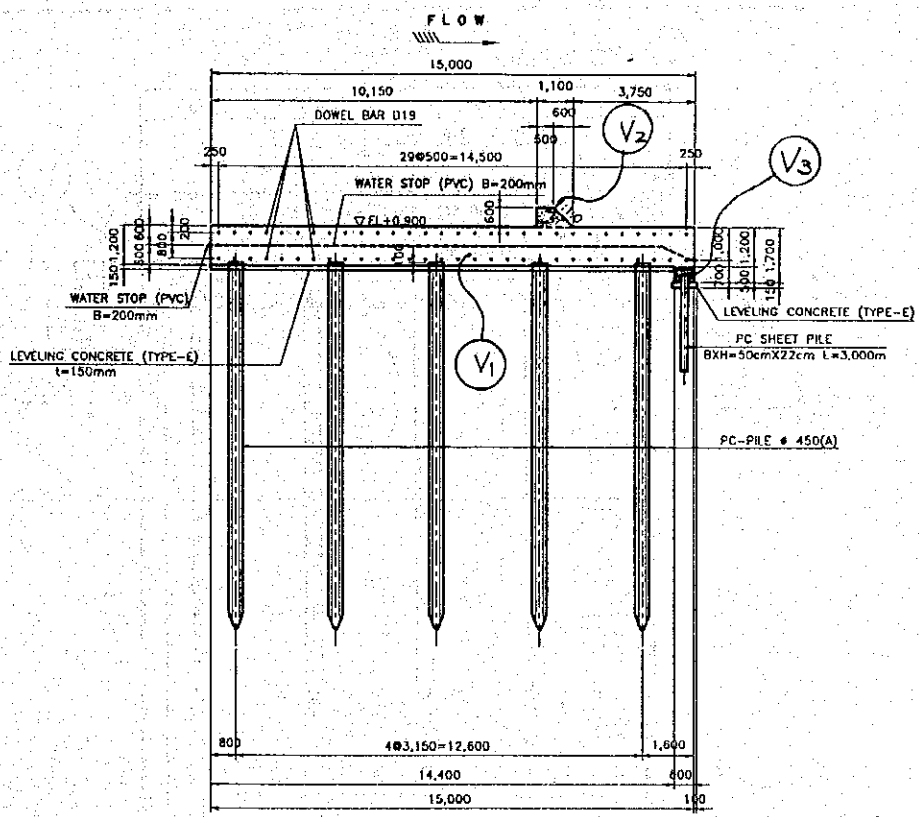
CALCULATION	RESULT
(TYPE - C1)	
$V_1 = 1.20 \times 15.00 \times 15.30 = 275.400$	
$V_2 = (1.10 + 0.50) \times \frac{1}{2} \times 0.60 \times 15.30 = 7.344$	
$V_3 = 0.60 \times 0.50 \times 15.30 = 4.590$	
(Deduction for PC Sheet Pile)	
$V_4 = -(0.22 \times 0.25 \times 15.30) = -0.842$	
(Deduction for PC Pile)	
$V_5 = -(\frac{\pi}{4} \times 0.45^2 \times 0.10 \times 20 \text{ piles}) = -0.318$	
TOTAL = 286.174	286.174 m <sup>3</sup>

TYPE OF WORK : CONCRETE APRON (CEL+0.900)  
 : CONCRETE (TYPE-C1)  
 LOCATION : MIDDLE SECTION

EXPLANATORY DRAWING



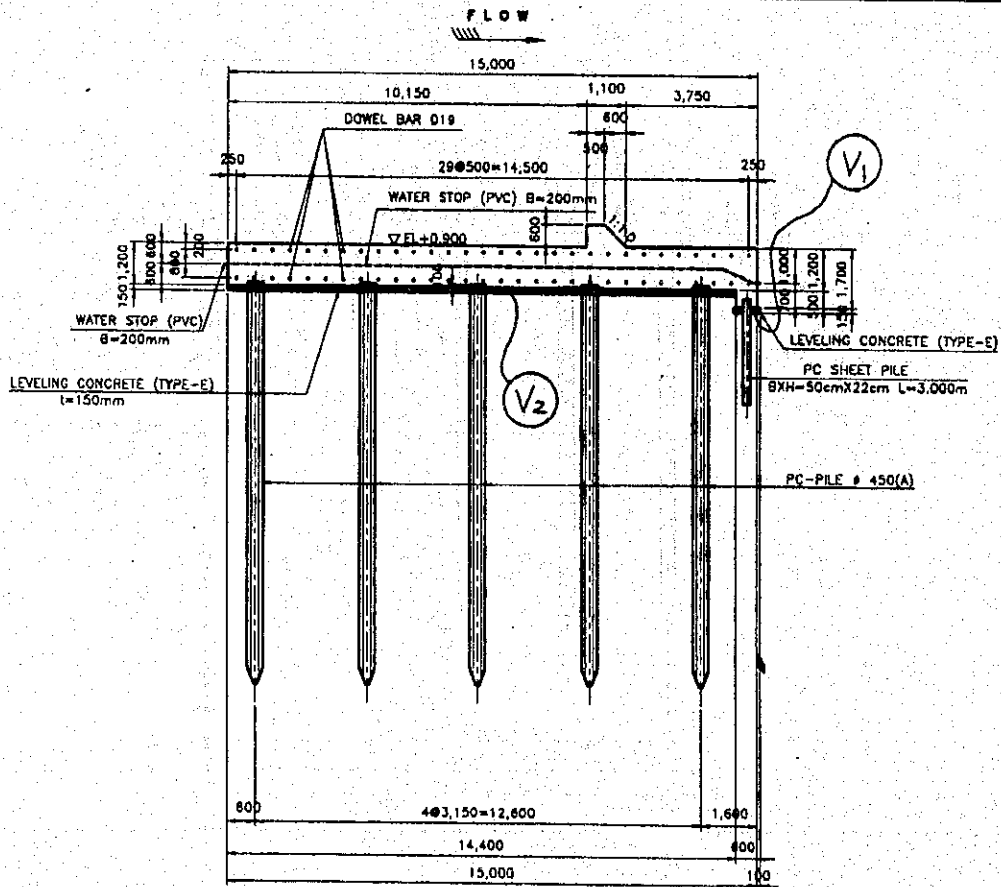
PLAN (MIDDLE SECTION)  
 SCALE A





CONCRETE APRON (EL. +0.900)

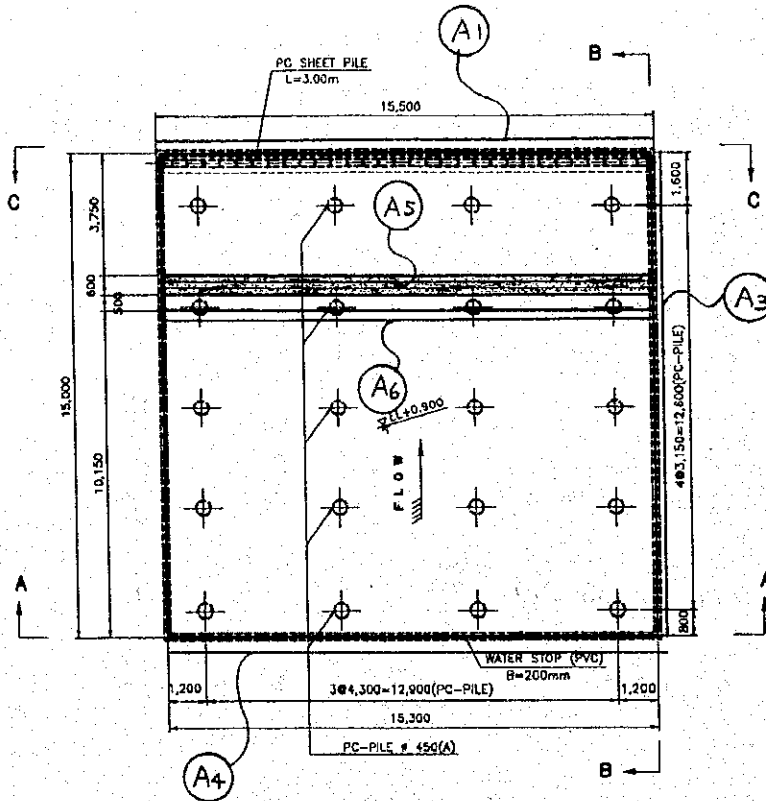
TYPE OF WORK :	CALCULATION	RESULT
LEVELING CONCRETE	(TYPE - E)	
LOCATION :		
MIDDLE SECTION		
	$V_1 = 0.80 \times 0.15 \times 15.30 = 1.836$	
	$V_2 = 17.40 \times 0.15 \times 15.30 = 33.048$	
	(Deduction for PC Sheet Pile)	
	$V_3 = - (0.22 \times 0.15 \times 15.30) = -0.505$	
	(Deduction for PC Pile)	
	$V_4 = - (\frac{1}{4} \times 0.45^2 \times 0.15 \times 20 \text{ piles}) = -0.477$	
	TOTAL = 33.902	33.902 m <sup>3</sup>





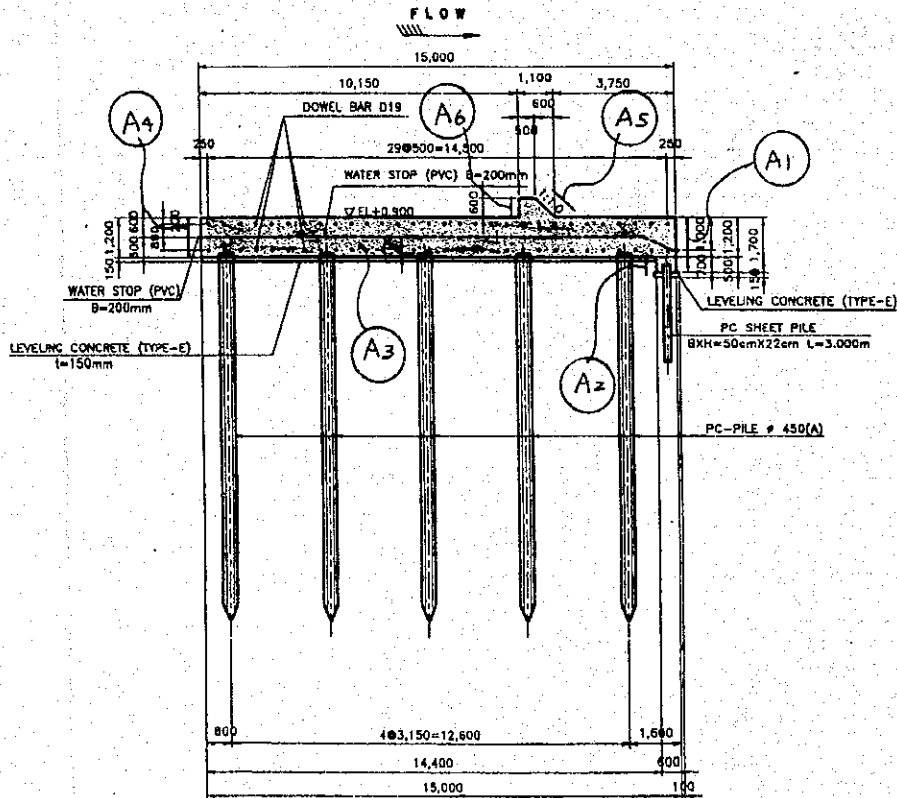
TYPE OF WORK : CONCRETE APRON (EL+0.900)  
 : FORM  
 LOCATION : MIDDLE SECTION

EXPLANATORY DRAWING



PLAN (MIDDLE SECTION)

SCALE A



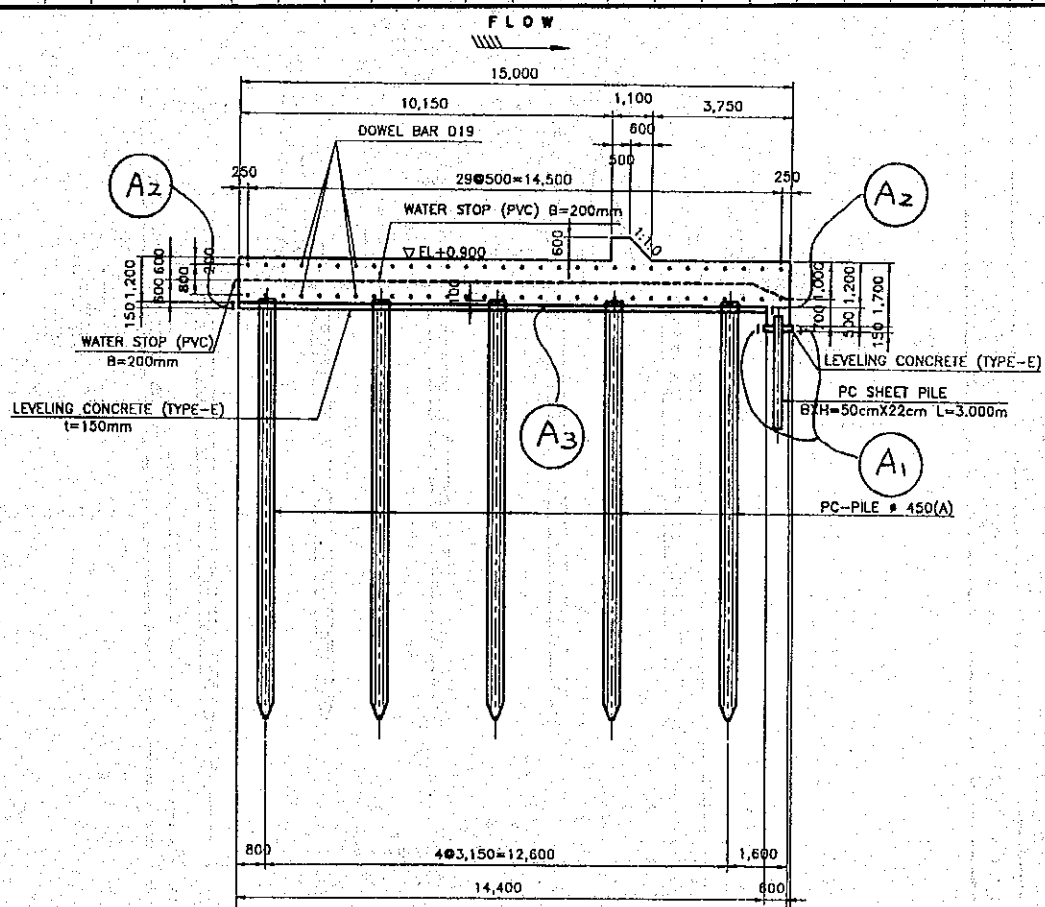
CONCRETE APRON (EL+0.900)

FORM OF LEVELING CONCRETE

MIDDLE SECTION

TYPE OF WORK :

LOCATION :

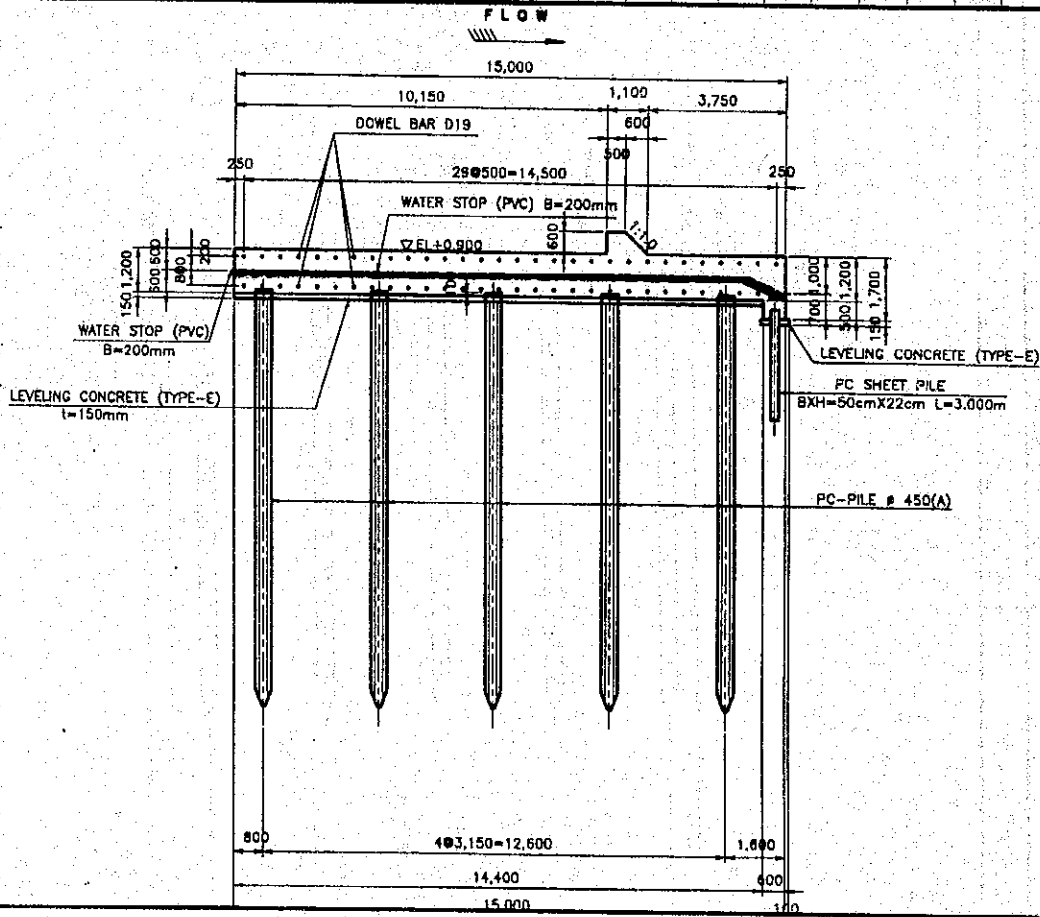


TYPE OF WORK :	LOCATION :	CALCULATION	RESULT
		(H < 4.0m)	
		$A_1 = 0.15 \times 15.30 \times 2 = 4.590$	
		$A_2 = 0.15 \times 15.30 \times 2 = 4.590$	
		$A_3 = (0.15 \times 14.40) + (0.15 \times 0.80 - 0.15 \times 0.22) = 2.247$	
		TOTAL = 11.427	11.427 m <sup>2</sup>

CONCRETE APRON (EL+0.900)

TYPE OF WORK : WATER STOP

LOCATION : MIDDLE SECTION



CALCULATION

$B = 200 \text{ mm}$

$L_1 = 14.10 + 1.00 = 15.100$

$L_2 = 15.300$

$TOTAL = 30.400 \text{ m}$

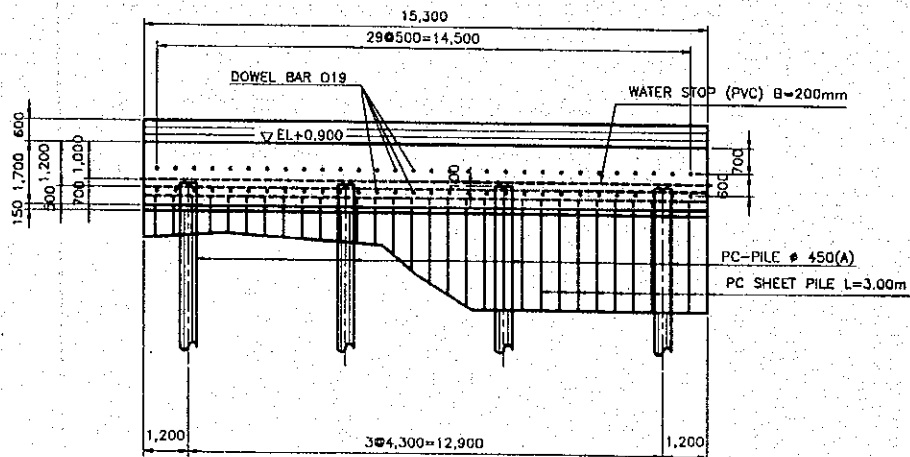
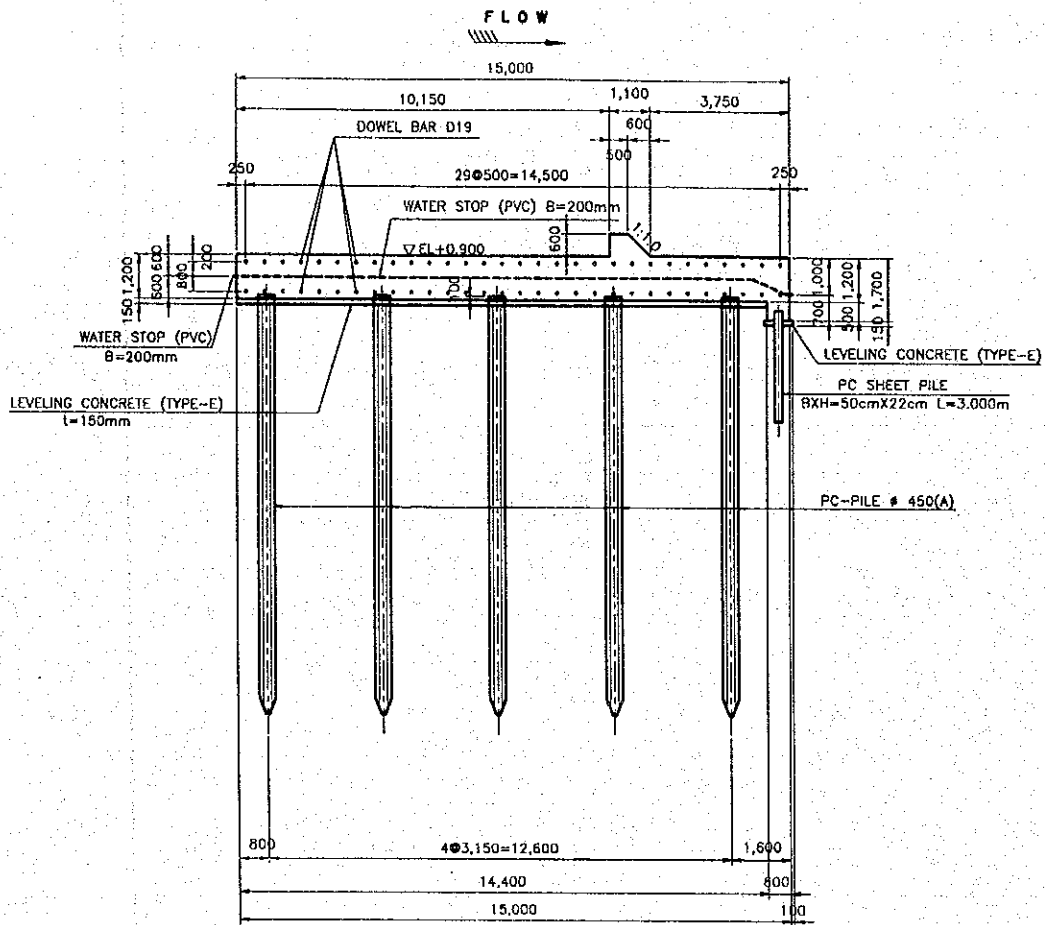
RESULT

30.400m



TYPE OF WORK : CONCRETE APRON (EL+0.900)  
 DOWEL BAR  
 LOCATION : MIDDLE SECTION

EXPLANATORY DRAWING









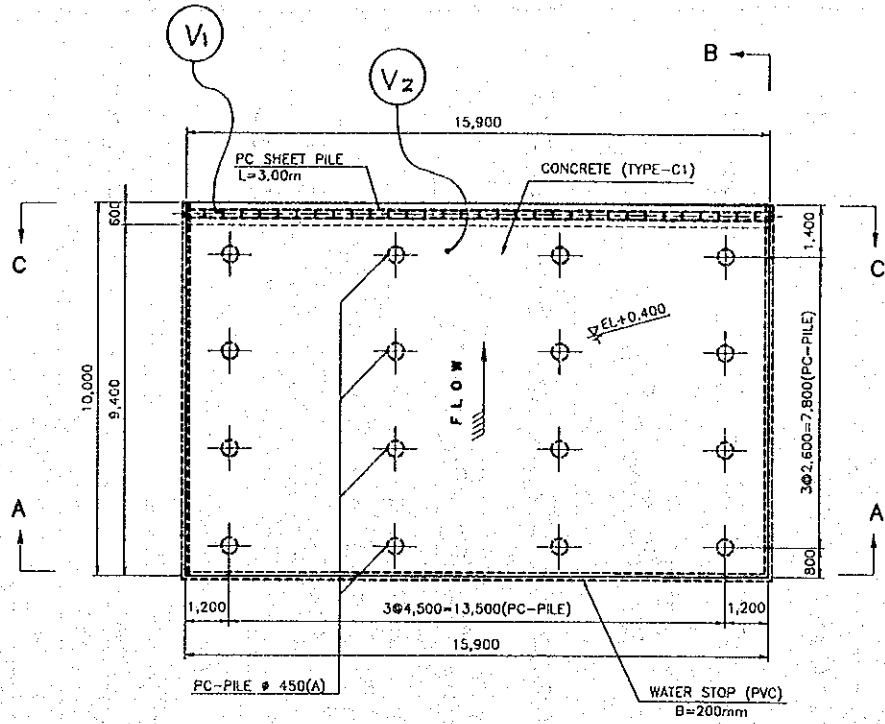
TYPE OF WORK : PILE HEAD TREATMENT  
 LOCATION : CONCRETE APRON (EL. +0.900)  
 : No. 2 to No. 5

CALCULATION	RESULT
<b>PC PILE DIA 450 (A) n = 20 PILES</b>	
LENGTH OF DESIGN : $L_1 = 10.70$ m	
SPARE PILE LENGTH : $L_2 = 1.00$ m	
Therefore, ADOPTED PILE LENGTH :	
$L = 10.70 + 1.00 = 11.70$ 12.00 m/pile	20 places
<b>PILING</b>	
N VALUE : N = 22 (Average)	
D = 10.70 m/pile	20 places
<b>CONCRETE FILLING (TYPE-C1) n = 20 PILES</b>	
$V = \frac{\pi}{4} \times 0.29^2 \times 1.15 = 0.076$ m <sup>3</sup> /pile	20 places
<b>SUSPENDED FORM</b>	
$A = \frac{\pi}{4} \times 0.29^2 = 0.066$ m <sup>3</sup> /pile	20 places
<b>REINFORCING BAR</b>	
D 13 (W = 1.04 kg/m)	
$W_1 = 6 \text{ Bars} \times 1.65 \times 1.04 = 10.296$	
$W_2 = 12 \text{ Bars} \times 0.96 \times 1.04 = 11.981$	
TOTAL W = 22.277 kg.f/pile	20 places
<b>CUTTING PILE HEAD</b>	
Height of cutting : h = 1.30 m/pile	
$V = \frac{\pi}{4} \times (0.45^2 - 0.29^2) \times 1.30 = 0.121$ m <sup>3</sup> /pile	20 places



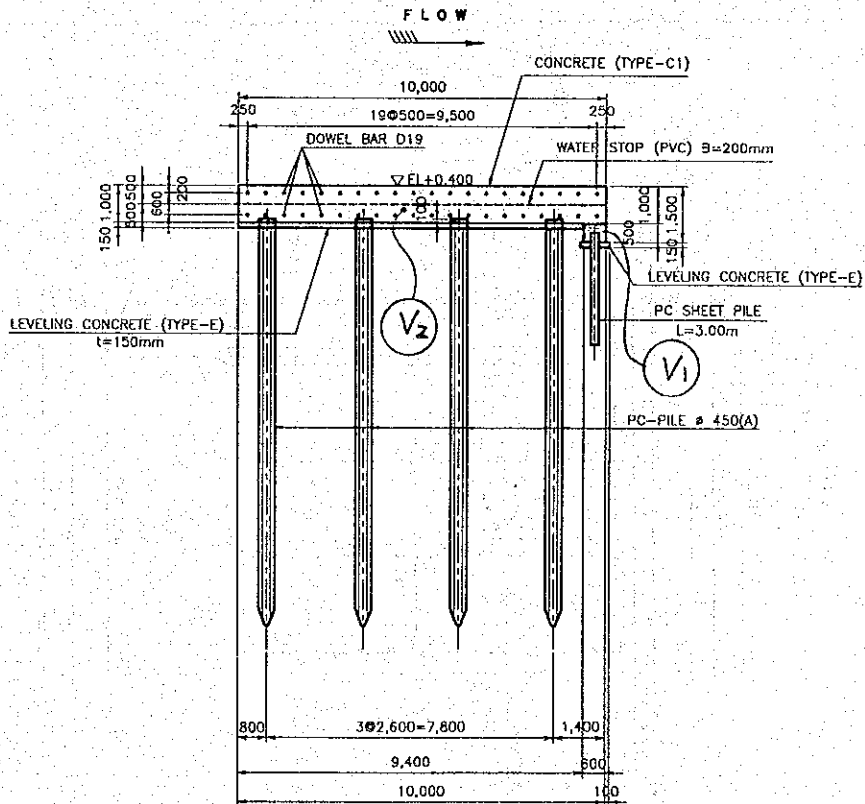
TYPE OF WORK : CONCRETE APRON (EL+0.400)  
 LOCATION : CONCRETE (TYPE-C1)

EXPLANATORY DRAWING



PLAN

SCALE A

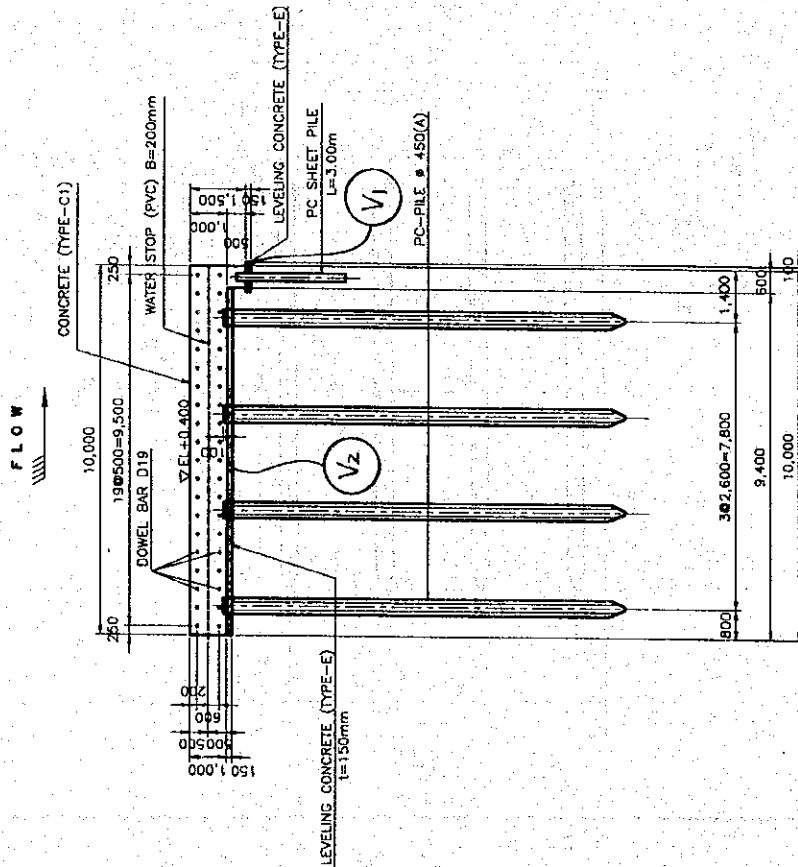


CONCRETE APRON (EL+0.400)

LEVELING CONCRETE

TYPE OF WORK :

LOCATION :



CALCULATION

(TYPE - E)

$$V_1 = 0.80 \times 0.15 \times 15.90 = 1.908$$

$$V_2 = 0.15 \times 9.90 \times 15.90 = 23.419$$

(Deduction for PC Sheet Pile)

$$V_3 = -(0.22 \times 0.15 \times 15.90) = -0.525$$

(Deduction for PC Pile)

$$V_4 = -\left(\frac{1}{4} \times 0.45^2 \times 0.15 \times 16 \text{ piles}\right)$$

$$= -0.382$$

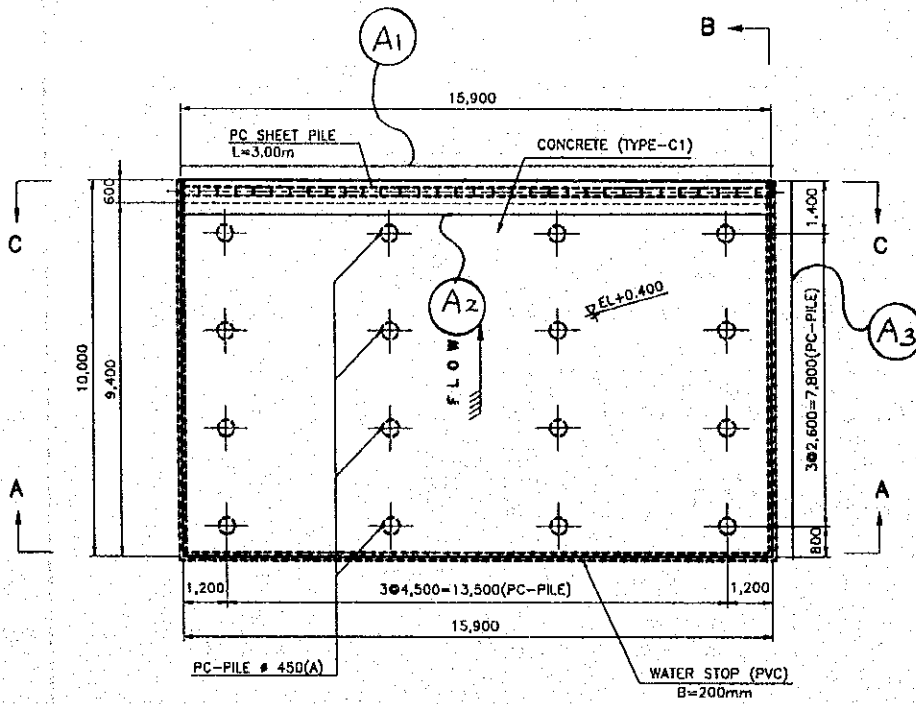
$$\text{TOTAL} = 23.420 \text{ m}^3$$

RESULT



TYPE OF WORK : CONCRETE APRON (EL+0.400)  
 FORM : FORM  
 LOCATION :

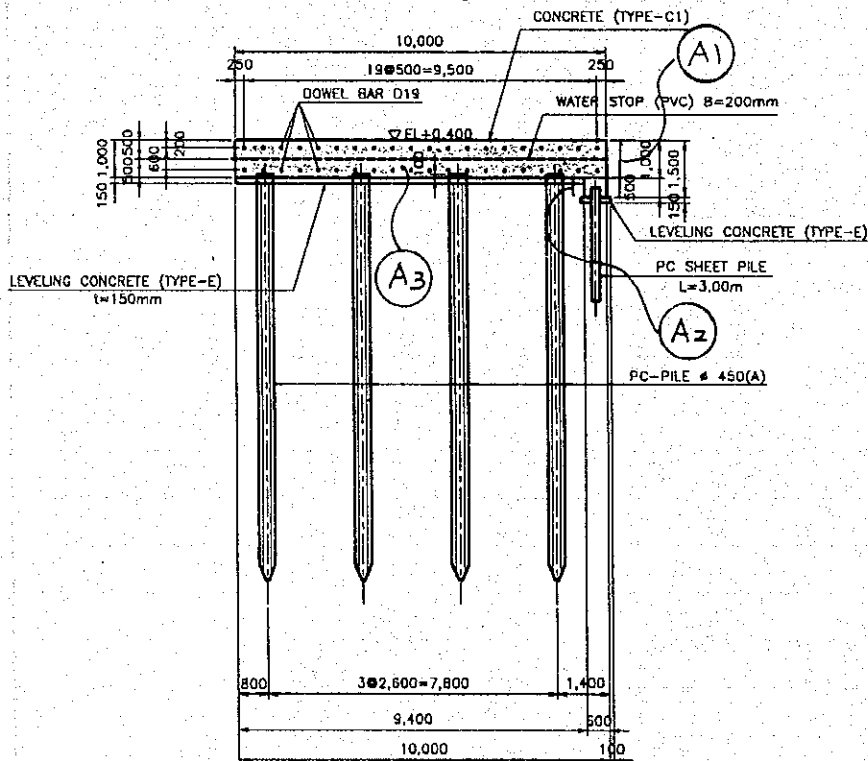
EXPLANATORY DRAWING



PLAN

SCALE: A

FLOW









CONCRETE APRON CEL+0.400

TYPE OF WORK:	CALCULATION	RESULT
DOWEL BAR	Reinforcing Bar : $\phi 19$ , $L = 1.24$ m/Bar	
LOCATION:	$n = 20 \times 2 = 40$ Bars	
	$\phi 19$ : $w = 2.23$ kgf/m	
	$W = 40$ Bars $\times 1.24 \times 2.23 = 110.608$ kgf	110.608 kgf
	- PVC PIPE $\phi 25$ ( $L = 0.55$ m/pipe )	
	$n = 40$ pipes	
	$L = 40$ pipes $\times 0.55 = 22.000$ m	22.000m

