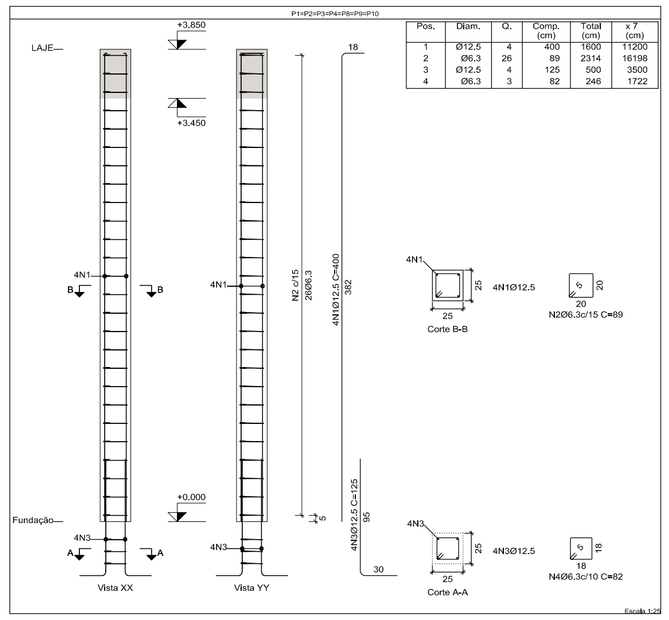
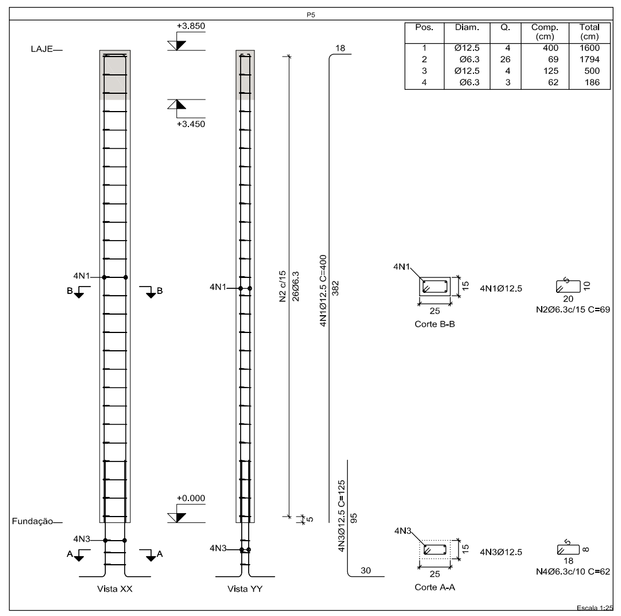
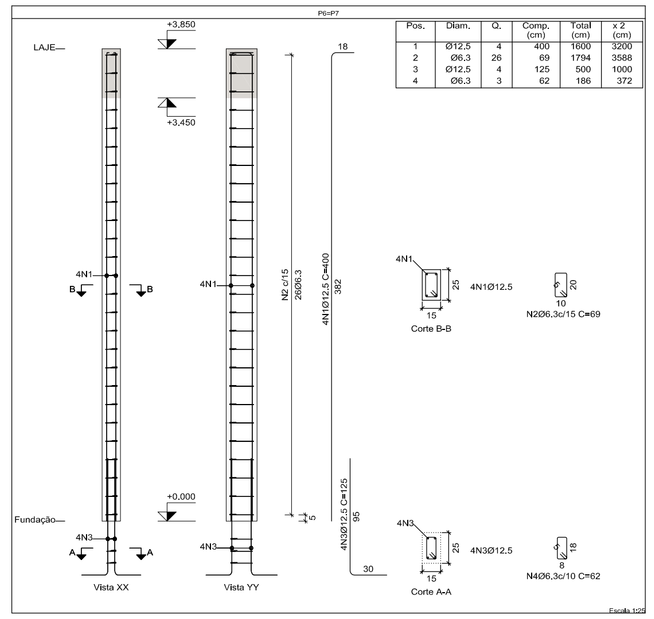
Elemento	Pos.	Diam.	Q.	Esquema (cm)	Comp. (cm)	Total (cm)	CA-50 (kg)	CA-60 (kg)
P1=P2=P3=P4=P8 P9=P10	1	Ø12.5	4	382 / 18	400	1600	15.4	
	2	Ø6.3	26	20 / 20	89	2314	5.7	
	3	Ø12.5	4	20 / 95	125	500	4.8	
	4	Ø6.3	3	20 / 20 / 18	82	246	0.6	
					Total+10%:	1600	15.4	
					(x7):	11200	107.8	
P5	1	Ø12.5	4	382 / 18	400	1600	15,4	
	2	Ø6.3	26	20 / 20	69	1794	4.4	
	3	Ø12.5	4	20 / 95	125	500	4.8	
	4	Ø6.3	3	20 / 18	62	186	0.5	
					Total+10%:	3200	30.8	
					(x2):	6400	61.6	
P6=P7	1	Ø12.5	4	382 / 18	400	1600	15.4	
	2	Ø6.3	26	20 / 20 / 10	69	1794	4,4	
	3	Ø12.5	4	20 / 95	125	500	4.8	
	4	Ø6.3	3	20 / 20 / 18 / 8	62	186	0.5	
					Total+10%:	3588	34.5	
					(x2):	7176	69.0	
					Ø6.3:	65.2	0.0	
					Ø12.5:	222.0	0.0	
					Total:	287.2	0.0	



Pos.	Diam.	Q.	Comp. (cm)	Total (cm)	x 7 (cm)
1	Ø12,5	4	400	1600	11200
2	Ø6.3	26	89	2314	16198
3	Ø12,5	4	125	500	3500
4	Ø6.3	3	82	246	1722



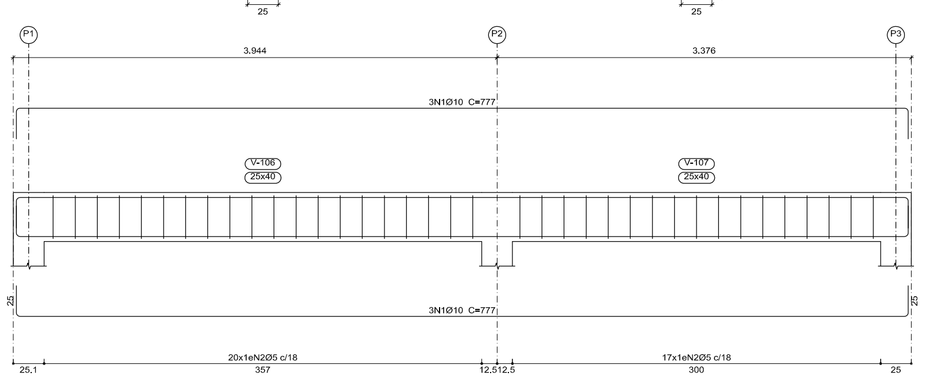
Pos.	Diam.	Q.	Comp. (cm)	Total (cm)
1	Ø12,5	4	400	1600
2	Ø6.3	26	69	1794
3	Ø12,5	4	125	500
4	Ø6.3	3	62	186



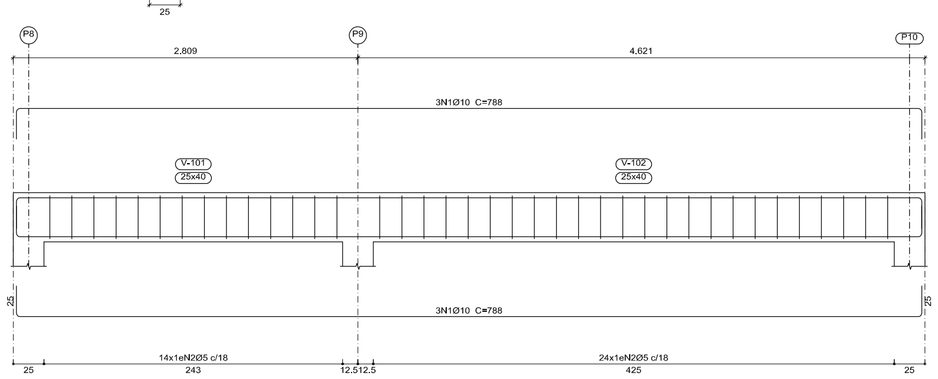
Pos.	Diam.	Q.	Comp. (cm)	Total (cm)	x 2 (cm)
1	Ø12,5	4	400	1600	3200
2	Ø6.3	26	69	1794	3588
3	Ø12,5	4	125	500	1000
4	Ø6.3	3	62	186	372

Elemento	Pos.	Diam.	Q.	Esquema (cm)	Comp. (cm)	Total (cm)	CA-50 (kg)	CA-60 (kg)
V 1	1	Ø10	6	10 / 738 / 10	788	4728	29,1	
	2	Ø5	38	30 / 5 / 20	118	4484		7.0
					Total+10%:	32.0		7.7
V 2	1	Ø10	5	10 / 725 / 10	775	3875	23.9	
	2	Ø5	38	30 / 5 / 10	98	3724		5.8
					Total+10%:	26.3		6.4
V 3	1	Ø10	6	10 / 727 / 10	777	4662	28.7	
	2	Ø5	37	30 / 5 / 20	118	4366		6.9
					Total+10%:	31.6		7.6
V 4	1	Ø10	6	10 / 609 / 10	659	3954	24.4	
	2	Ø5	31	30 / 5 / 20	118	3658		5.7
					Total+10%:	26.8		6.3
V 5	1	Ø10	2	250	250	500	3.1	
	2	Ø10	2	10 / 250 / 10	300	600	3.7	
	3	Ø5	12	30 / 5 / 10	98	1176		1.8
					Total+10%:	7.5		2.0
V 6	1	Ø10	2	10 / 407 / 10	457	914	5.6	
	2	Ø12.5	7	10 / 407 / 10	457	3199	30.8	
	3	Ø5	21	30 / 5 / 10	98	2058		3.2
					Total+10%:	40.0		3.5
V 7	1	Ø10	5	10 / 655 / 10	705	3525	21.7	
	2	Ø5	33	30 / 5 / 10	98	3234		5.1
					Total+10%:	23.9		5.6
					Ø5:	0.0	39.1	
					Ø10:	154.3	0.0	
					Ø12.5:	33.8	0.0	
					Total:	188.1	39.1	

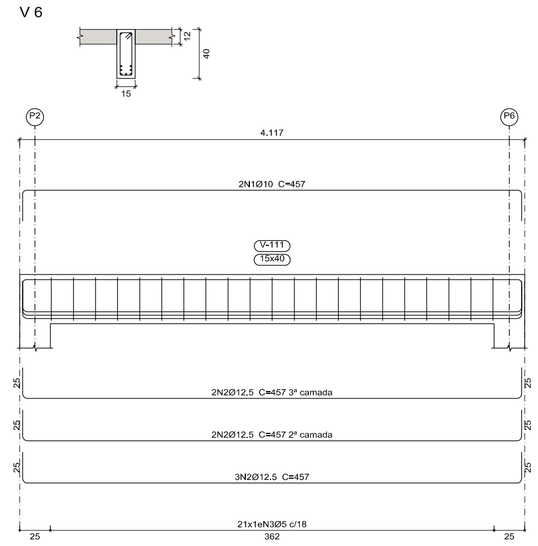
V 3



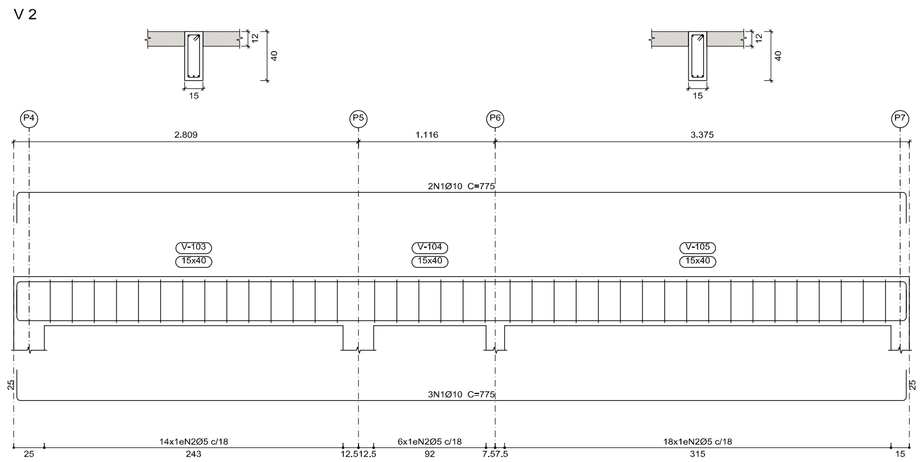
V 1



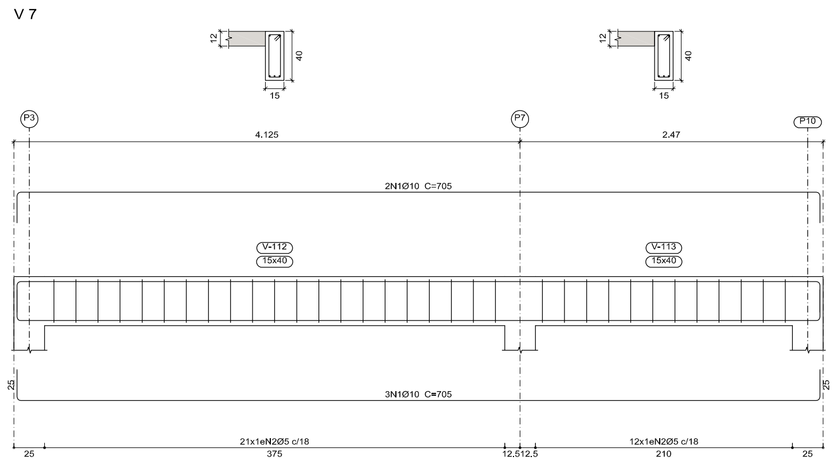
V 6



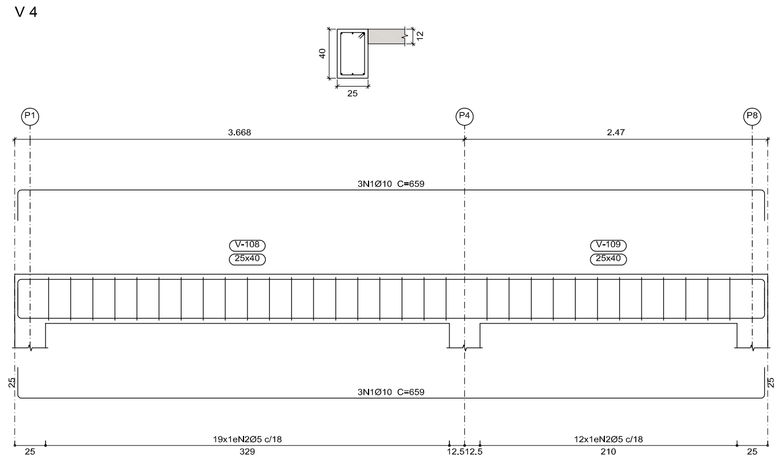
V 2



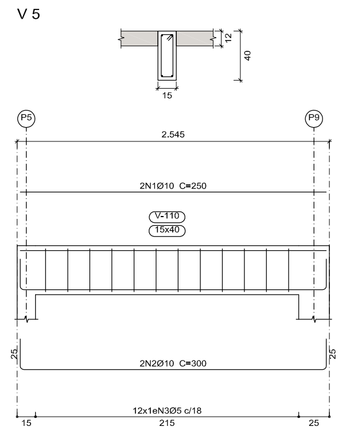
V 7



V 4



V 5



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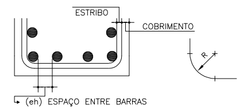
CARACTERÍSTICAS DO CONCRETO

Concreto: C-30
Fator água/cimento máximo: 0,55
Consumo de cimento teórico: >= 320 kg/m3
Consumo de cimento recomendado: >= 350 kg/m3
Módulo de deformação mín na desforma: 27 GPa
Massa específica aparente: 2.5 Tf/m3
Coef. segurança (Aço): 1.15
Corf. segurança (Concreto): 1.40

OBSERVAÇÕES

- Respeitar o cobrimento das armaduras.
- Executar o controle tecnológico dos materiais.
- Executar a cura úmida do concreto por 7 dias.
- Prever lastro de concreto 5 cm em peças de concreto.
- Implantação ver projeto de arquitetura.
- Conferir as medidas no local.



COEF. DE SEGURANÇA: AÇO.....1.15
CONCRETO.....1.40

COBRIMENTO DAS ARMADURAS					COB cm
DIÂMETRO	ø12.5	ø16	ø20	ø25	ø30
RAIO (R)	6	8	10	13	15

eh >= DIÂMETRO DAS BARRAS
eh >= 2cm

NORMAS TÉCNICAS

ABNT NBR 6118/2014
ABNT NBR 6120/2019
ABNT NBR 6123/1988
ABNT NBR 6122/2019
ABNT NBR 7480/2007
ABNT NBR 8808/2008

Número	Descrição	Data

Projeto Estrutural

BANHEIRO SUPERIOR
PILARES E VIGAS

FL-10_EST_0

Número do projeto	
Data	25/09/2022
Autor	Eng. Civil Airton Sonego Jr
Verificado por	

FL-10

Escala 1/25