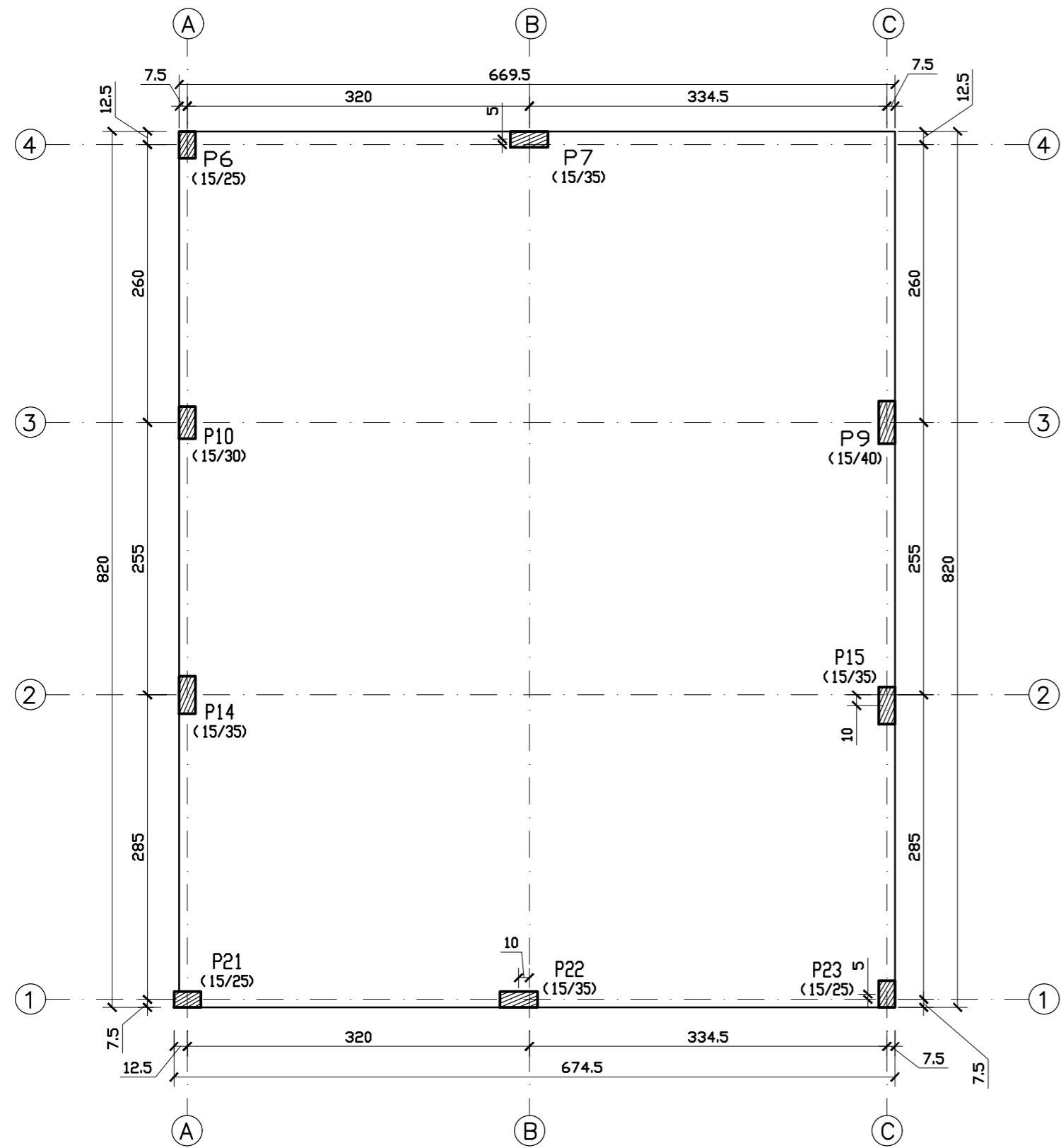


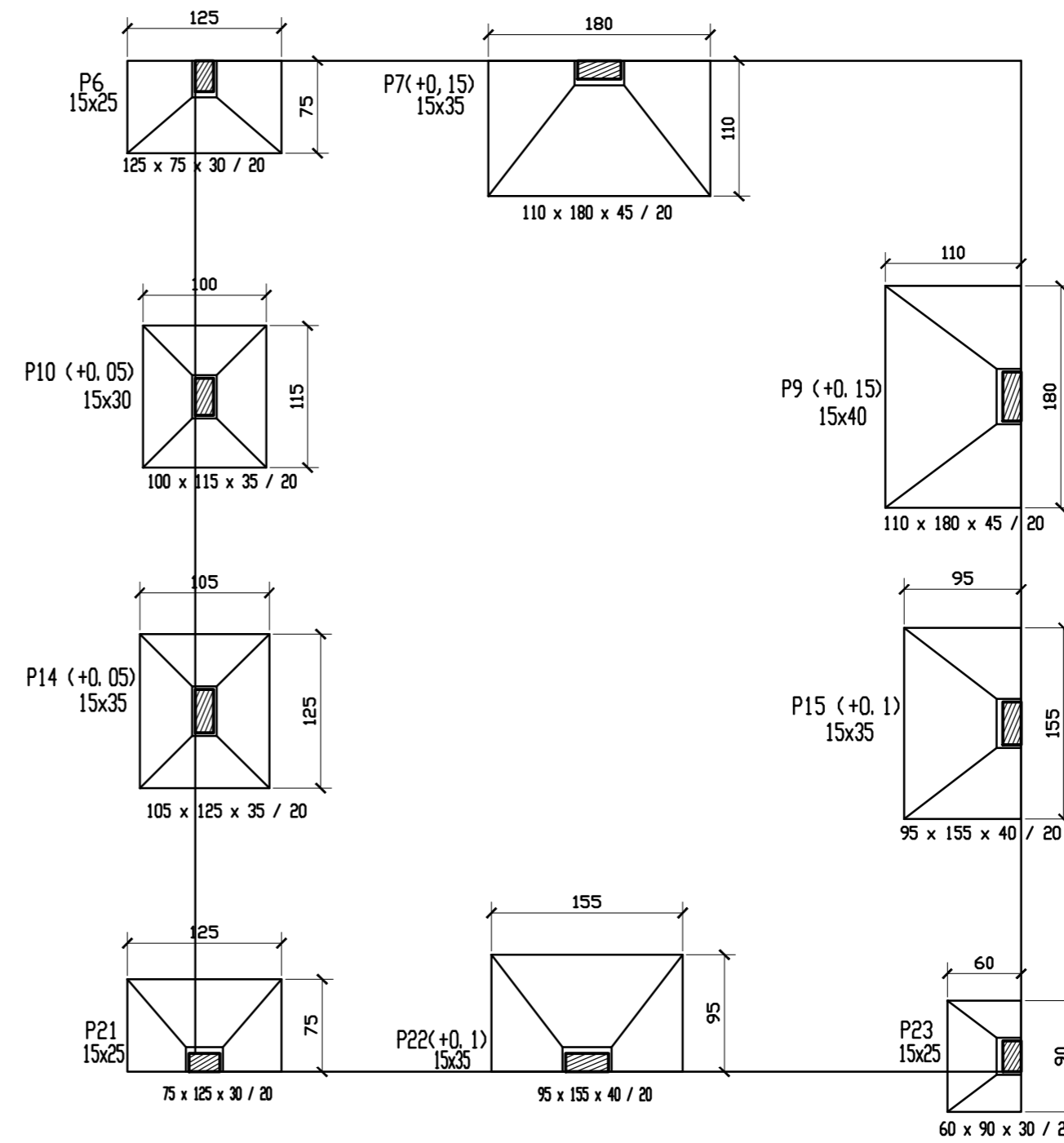
LOCAÇÃO PILARES

ESCALA 1:50
DIMENSÕES EM cm
NVEIS EM m



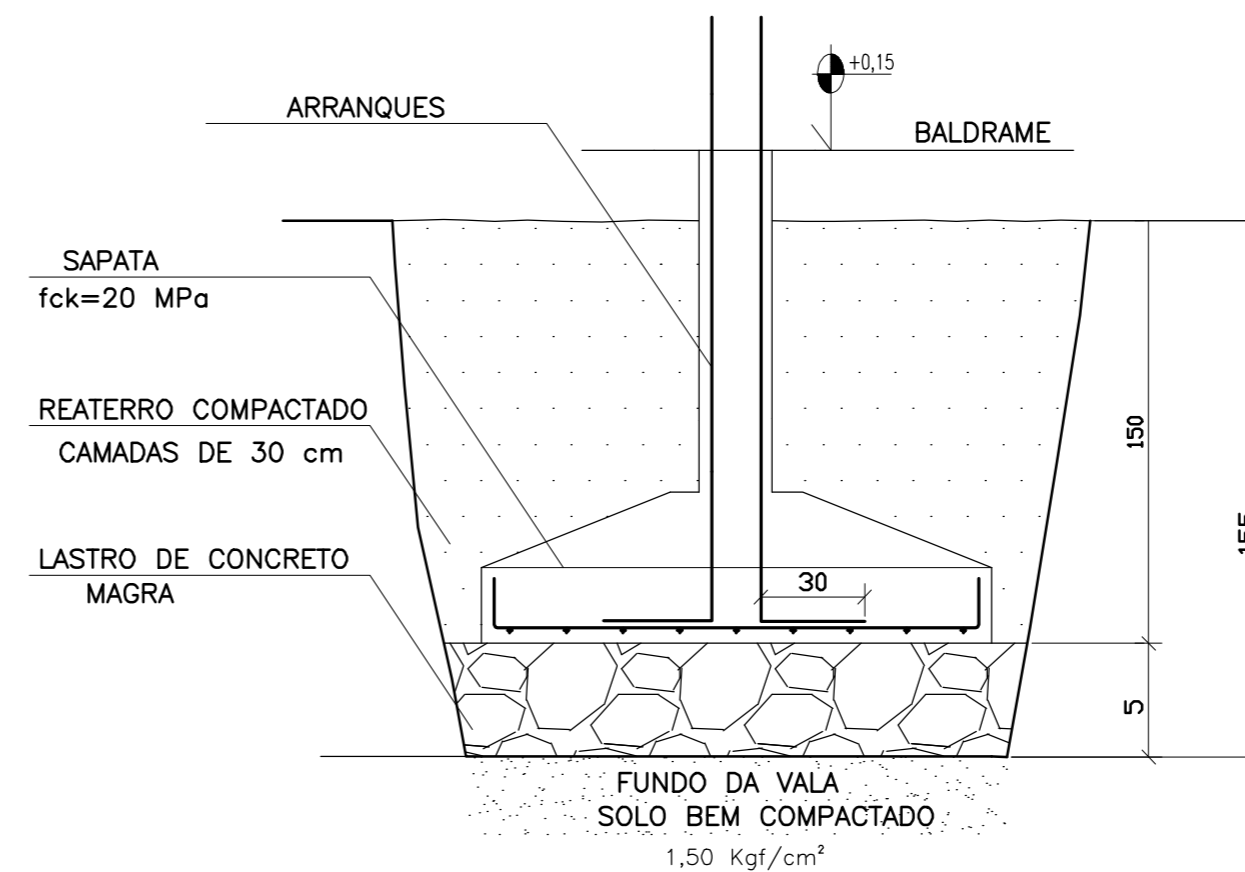
FORMA SAPATAS

ESCALA 1:50
DIMENSÕES EM cm
NVEIS EM m



DETALHE TÍPICO 01 REFORÇO FUNDO DAS SAPATAS

ESCALA 1:20
DIMENSÕES EM cm

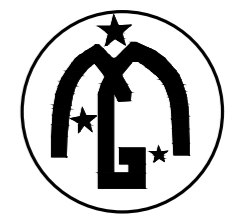


QUADROS FERROS / LEGENDAS

NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, $p=1,50 \text{ Kgf/cm}^2$.
- CONCRETO ESTRUTURAL DAS SAPATAS: $f_{ck}=18 \text{ Mpa}$
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: $f_{ck}=20 \text{ Mpa}$.
- COBRIMENTO FERRAGEM SAPATAS = 3 cm
- ANTES DA CONCRETAGEM DAS SAPATAS, COMPACTAR BEM O SOLO DO FUNDO DAS VALAS E EXECUTAR UM LASTRO DE CONCRETO MAGRO, ESPESSURA DE 5 CM, CONFORME DETALHE TÍPICO 01.

PREFEITURA MUNICIPAL DE MARLIÉRIA-MG
PRAÇA J.K., N°106, CENTRO, CNPJ:16.796.872/0001-48



PREFEITO: GERALDO MAGELA BORGES DE CASTRO
SECRETÁRIO OBRAS: HENRIQUE DE CASTRO NETO

RESPONSÁVEL TÉCNICO:

FREDERICO HORTA MIRANDA
ENG° CIVIL - CREA 56.354/D

PROJETO: **PROJETO ESTRUTURAL**

AMPLIAÇÃO DA ESCOLA MUNICIPAL JOSÉ PEDRO DA SILVA, DISTRITO DE CAVA GRANDE

CONTEÚDO:

LOCAÇÃO DOS PILARES
FORMA SAPATAS
DETALHE FUNDAÇÃO

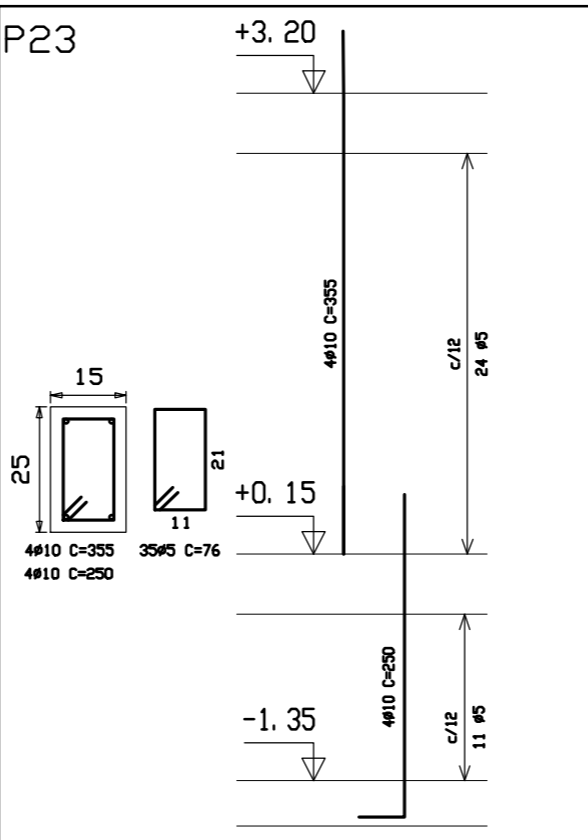
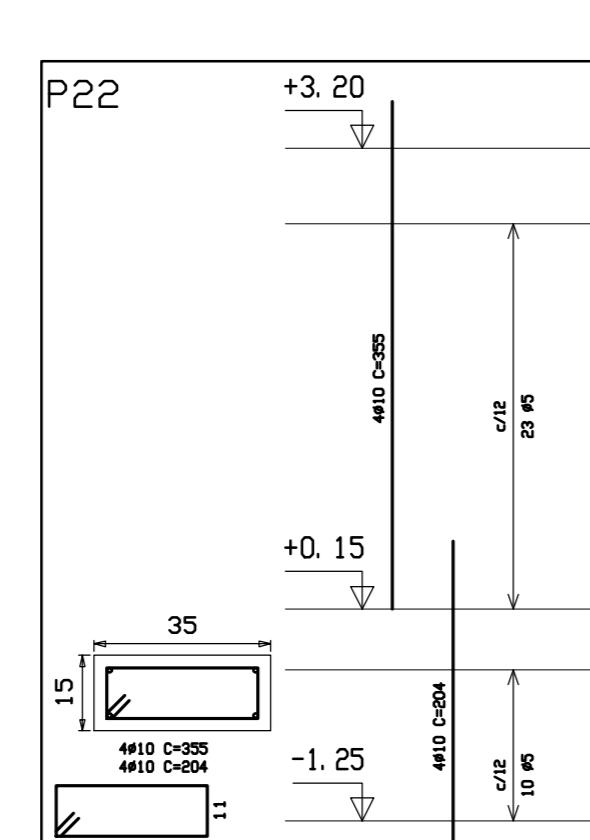
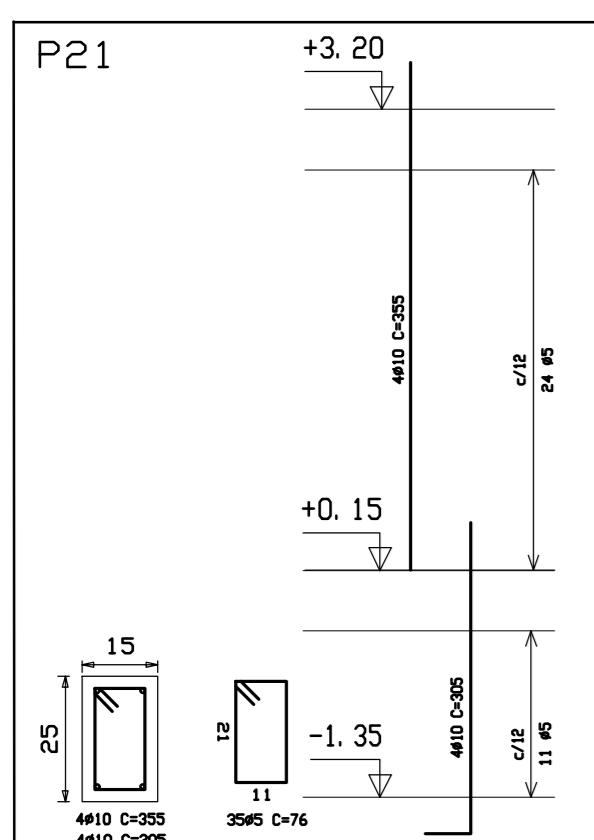
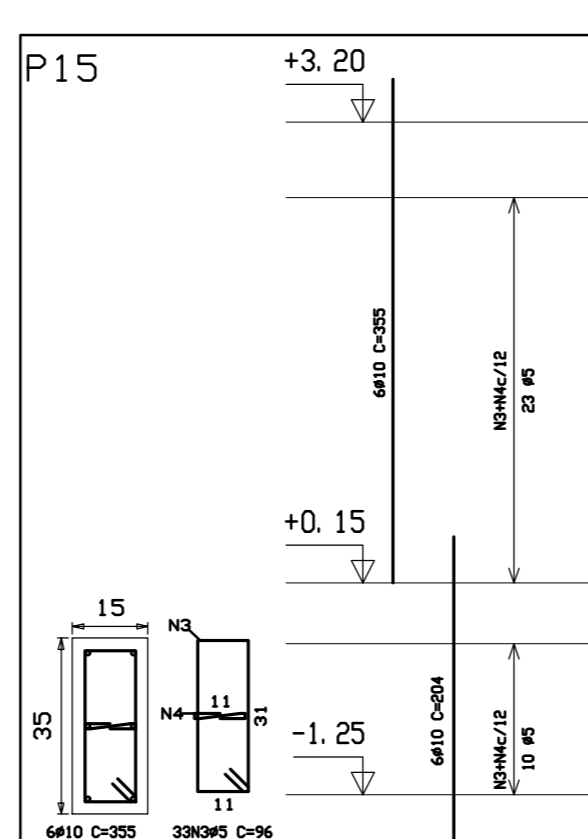
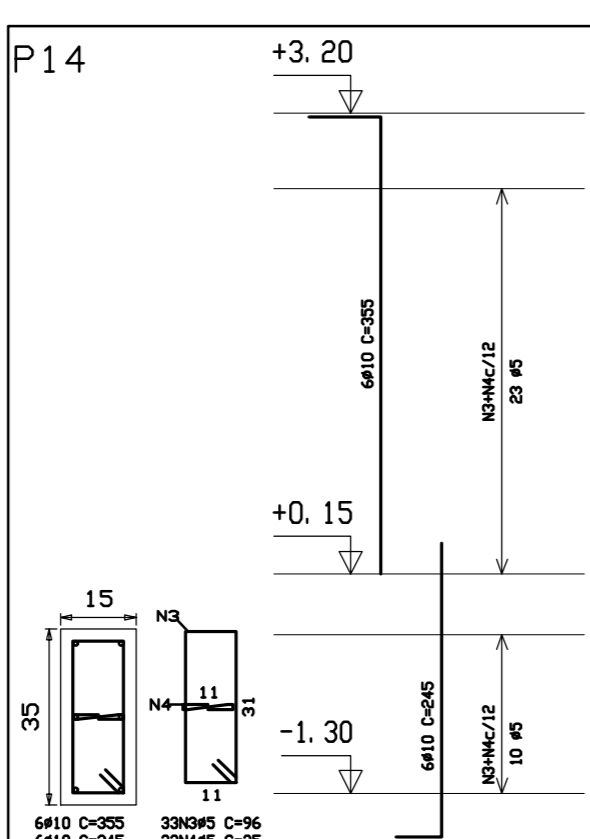
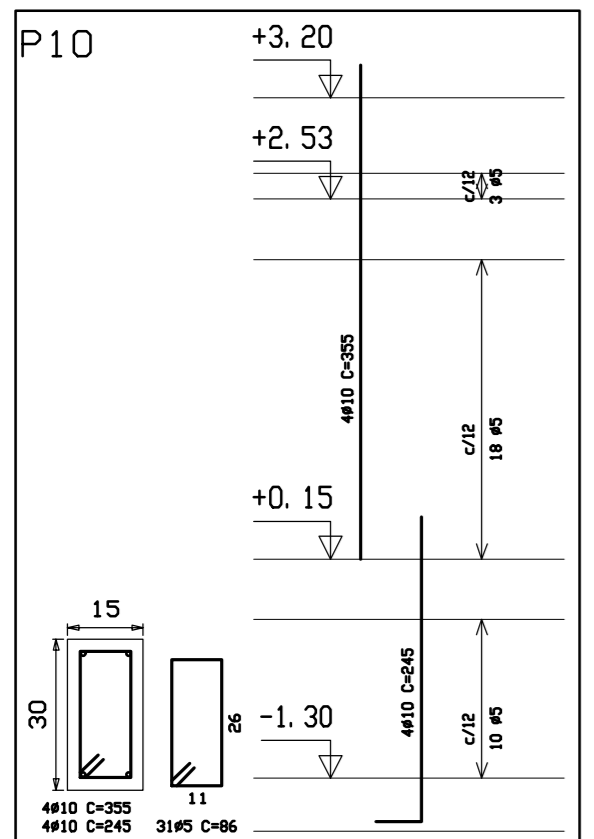
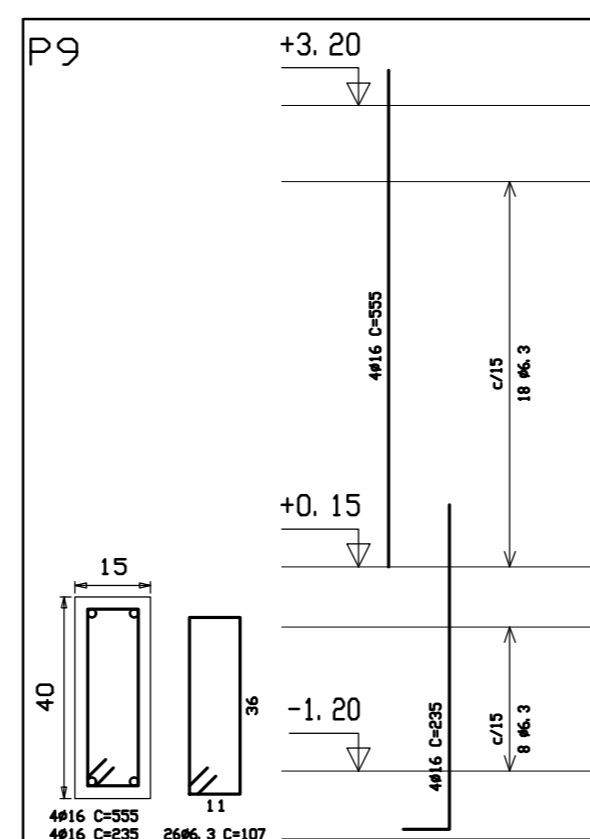
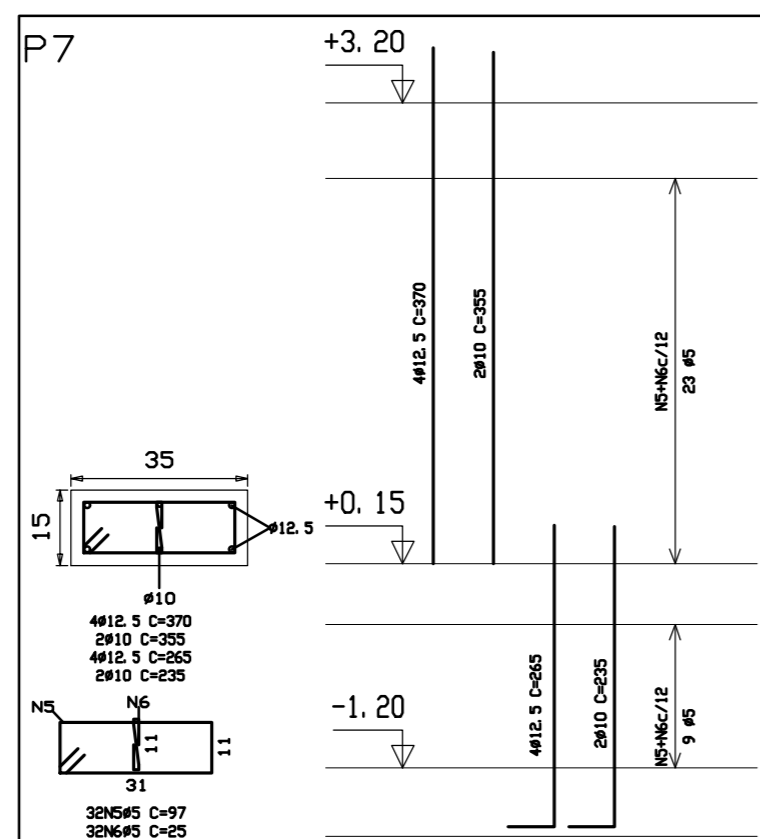
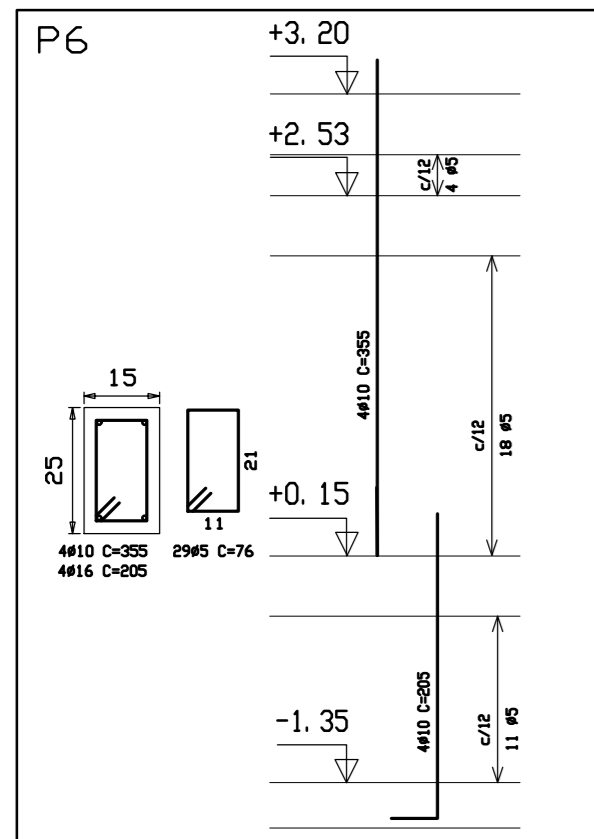
| | | |
|----------------------|---------------------|---------------------|
| DESENHO: VIVIANE | ESCALA: INDICADAS | PROJETO N°: 11/2015 |
| CONFERIDO: FREDERICO | REVISÃO N°: 00 | PRANCHA: 01/05 |
| APROVADO: FREDERICO | DATA: SETEMBRO/2018 | |

ARMAÇÃO PILARES COM ARRANQUE

ESCALA HORIZONTAL 1:15 - VERTICAL 1:50

DIMENSÕES EM cm

NIVEIS EM m



| Elemento | Pos | Di | Dob | Re | ta | Dob | (cm) | (cm) | (cm) | Total | | ACA-50 | | ACA-60-B | | |
|-----------|-----------|-------|-----|-----|-----|-----|------|------|------|-------|--------|--------|------|----------|------|--|
| | | | | | | | | | | (cm) | (cm) | (kg) | (kg) | (kg) | (kg) | |
| P6 | 1 | Ø10 | 4 | 48 | 302 | | | | | 350 | 1400 | 8.8 | | | | |
| | 2 | Ø5 | 22 | 76 | 76 | | | | | 76 | 1672 | | 2.6 | | | |
| Total+10% | | | | | | | | | | | | 9.7 | | 2.9 | | |
| P7 | 3 | Ø12.5 | 4 | 58 | 437 | | | | | 495 | 1980 | 19.4 | | | | |
| | 4 | Ø10 | 2 | 48 | 437 | | | | | 485 | 970 | 6.1 | | | | |
| | 5 | Ø12.5 | 4 | 30 | 94 | | | | | 124 | 496 | 4.9 | | | | |
| | 6 | Ø10 | 2 | 30 | 83 | | | | | 113 | 226 | 1.4 | | | | |
| | 7 | Ø5 | 32 | 97 | 97 | | | | | 97 | 3104 | | 4.9 | | | |
| | 8 | Ø5 | 32 | 25 | 25 | | | | | 25 | 800 | | 1.3 | | | |
| | Total+10% | | | | | | | | | | | | 35.0 | | 6.8 | |
| | P14 | 9 | Ø10 | 6 | 48 | 447 | | | | | 495 | 2970 | 18.7 | | | |
| 10 | | Ø10 | 6 | 30 | 73 | | | | | 103 | 618 | 3.9 | | | | |
| 11 | | Ø5 | 33 | 96 | 96 | | | | | 96 | 3168 | | 5.0 | | | |
| 12 | | Ø5 | 33 | 25 | 25 | | | | | 25 | 825 | | 1.3 | | | |
| Total+10% | | | | | | | | | | | | 24.9 | | 6.9 | | |
| P9 | 13 | Ø16 | 4 | 73 | 437 | | | | | 510 | 2040 | 32.0 | | | | |
| | 14 | Ø16 | 4 | 30 | 109 | | | | | 139 | 556 | 8.7 | | | | |
| | 15 | Ø6.3 | 26 | 107 | 107 | | | | | 107 | 2782 | | 6.9 | | | |
| | Total+10% | | | | | | | | | | | | 52.4 | | | |
| P10 | 16 | Ø10 | 4 | 48 | 447 | | | | | 495 | 1980 | 12.4 | | | | |
| | 17 | Ø10 | 4 | 30 | 73 | | | | | 103 | 412 | 2.6 | | | | |
| | 18 | Ø5 | 31 | 86 | 86 | | | | | 86 | 2666 | | 4.2 | | | |
| | Total+10% | | | | | | | | | | | | 16.5 | | 4.6 | |
| P15 | 19 | Ø10 | 6 | 48 | 442 | | | | | 490 | 2940 | 18.5 | | | | |
| | 20 | Ø10 | 6 | 30 | 78 | | | | | 108 | 648 | 4.1 | | | | |
| | 21 | Ø5 | 33 | 96 | 96 | | | | | 96 | 3168 | | 5.0 | | | |
| | 22 | Ø5 | 33 | 25 | 25 | | | | | 25 | 825 | | 1.3 | | | |
| Total+10% | | | | | | | | | | | | 24.9 | | 6.9 | | |
| P21 | 23 | Ø10 | 4 | 48 | 302 | | | | | 350 | 1400 | 8.8 | | | | |
| | 24 | Ø5 | 24 | 76 | 76 | | | | | 76 | 1824 | | 2.9 | | | |
| Total+10% | | | | | | | | | | | | 9.7 | | 3.2 | | |
| P22 | 25 | Ø10 | 4 | 48 | 442 | | | | | 490 | 1960 | 12.3 | | | | |
| | 26 | Ø10 | 4 | 30 | 78 | | | | | 108 | 432 | 2.7 | | | | |
| | 27 | Ø5 | 33 | 96 | 96 | | | | | 96 | 3168 | | 5.0 | | | |
| Total+10% | | | | | | | | | | | | 16.5 | | 5.5 | | |
| P23 | 28 | Ø10 | 4 | 48 | 302 | | | | | 350 | 1400 | 8.8 | | | | |
| | 29 | Ø5 | 24 | 76 | 76 | | | | | 76 | 1824 | | 2.9 | | | |
| Total+10% | | | | | | | | | | | | 9.7 | | 3.2 | | |
| | | | | | | | | | | | Ø5: | 0.0 | 40.0 | | | |
| | | | | | | | | | | | Ø10: | 120.2 | 0.0 | | | |
| | | | | | | | | | | | Total: | 199.3 | 40.0 | | | |

QUADROS FERROS / LEGENDAS

| Resumo Aço | Comp. total | Peso+10% | Total |
|--------------|-------------|----------|------------|
| Térreo | (m) | (kg) | |
| Pilares | | | |
| CA-50-A Ø6.3 | 27.8 | 8 | |
| Ø10 | 173.6 | 120 | |
| Ø12.5 | 24.8 | 27 | |
| Ø16 | 26.0 | 45 | 200 |
| CA-60-B Ø5 | 230.4 | 40 | 40 |
| Total | | | 240 |

NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, $p=1,50 \text{ Kgf/cm}^2$.
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: $f_{ck}=20 \text{ MPa}$.
- EXECUTAR AS FORMAS DOS ARRANQUES DOS PILARES COM 2 cm A MAIS EM CADA LADO, MANTENDO-SE OS ESTRIBOS COM AS DIMENSÕES INDICADAS.

PREFEITURA MUNICIPAL DE MARLIÉRIA-MG
PRAÇA J.K., N°106, CENTRO, CNPJ:16.796.872/0001-48



PREFEITO: GERALDO MAGELA BORGES DE CASTRO
SECRETÁRIO OBRAS: HENRIQUE DE CASTRO NETO

RESPONSÁVEL TÉCNICO:

FREDERICO HORTA MIRANDA
ENG° CIVIL - CREA 56.354/D

PROJETO: **PROJETO ESTRUTURAL**

AMPLIAÇÃO DA ESCOLA MUNICIPAL JOSÉ PEDRO DA SILVA, DISTRITO DE CAVA GRANDE

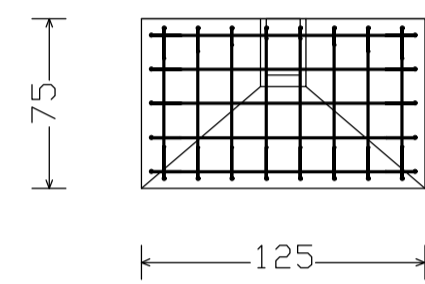
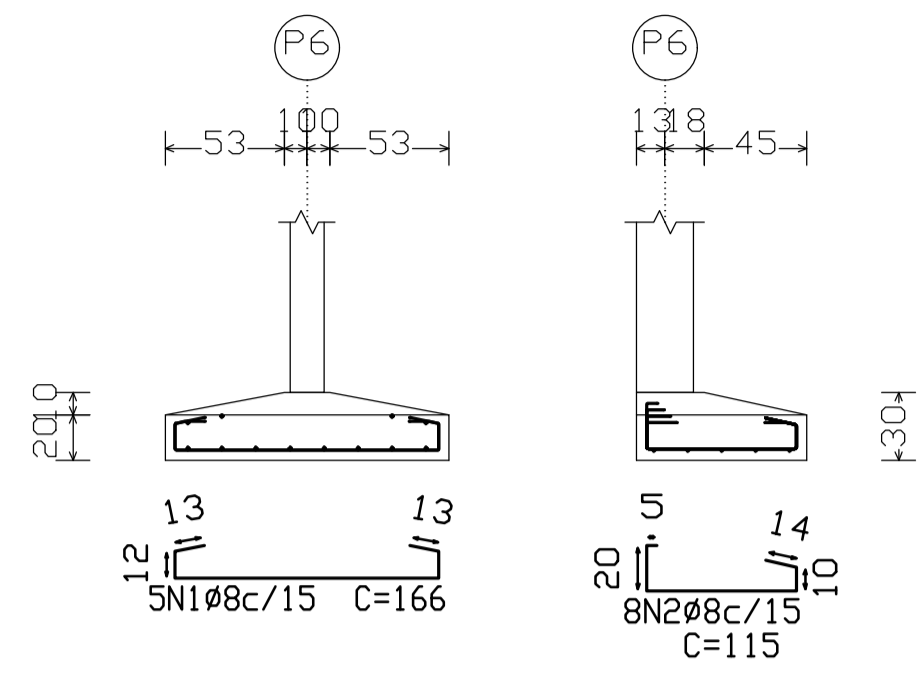
CONTEÚDO:
ARMAÇÃO DOS PILARES E ARRANQUES

| | | |
|----------------------|---------------------|---------------------|
| DESENHO: VIVIANE | ESCALA: INDICADAS | PROJETO N°: 11/2015 |
| CONFERIDO: FREDERICO | REVISÃO N°: 00 | PRANCHA: |
| APROVADO: FREDERICO | DATA: SETEMBRO/2018 | 02/05 |

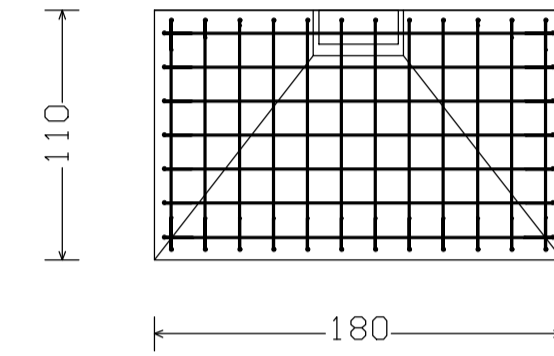
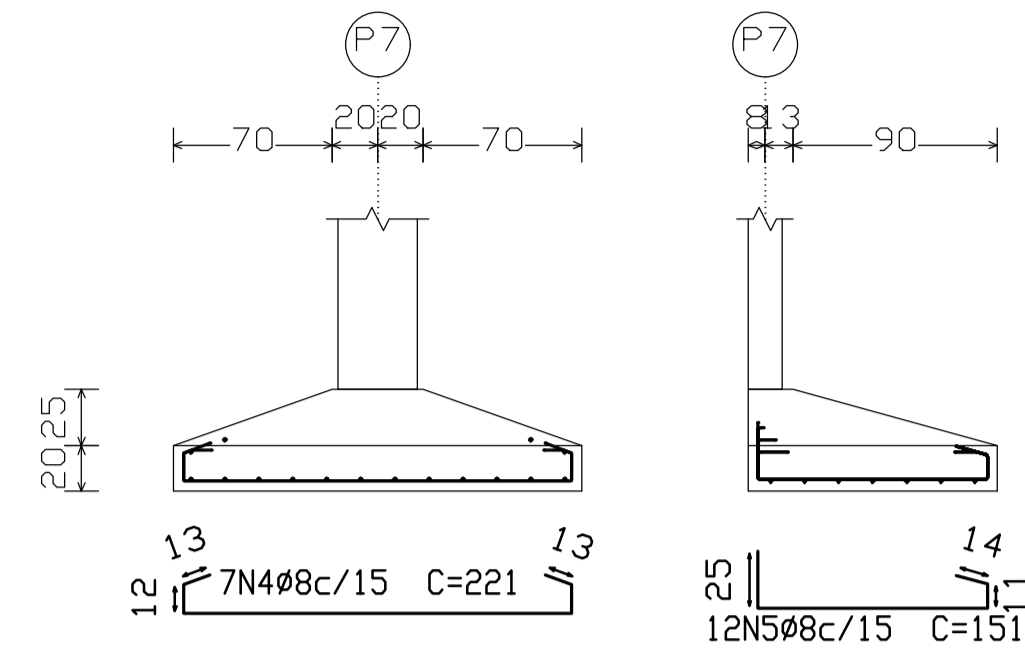
ARMAÇÃO SAPATAS

ESCALA 1:33
DIMENSÕES EM cm

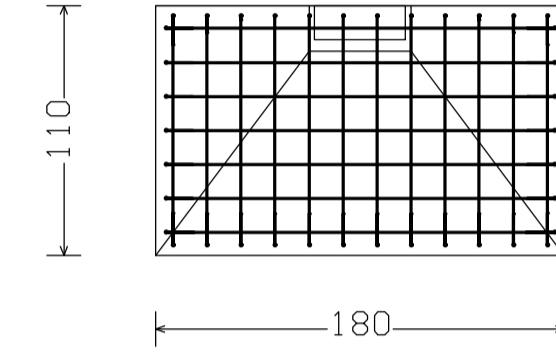
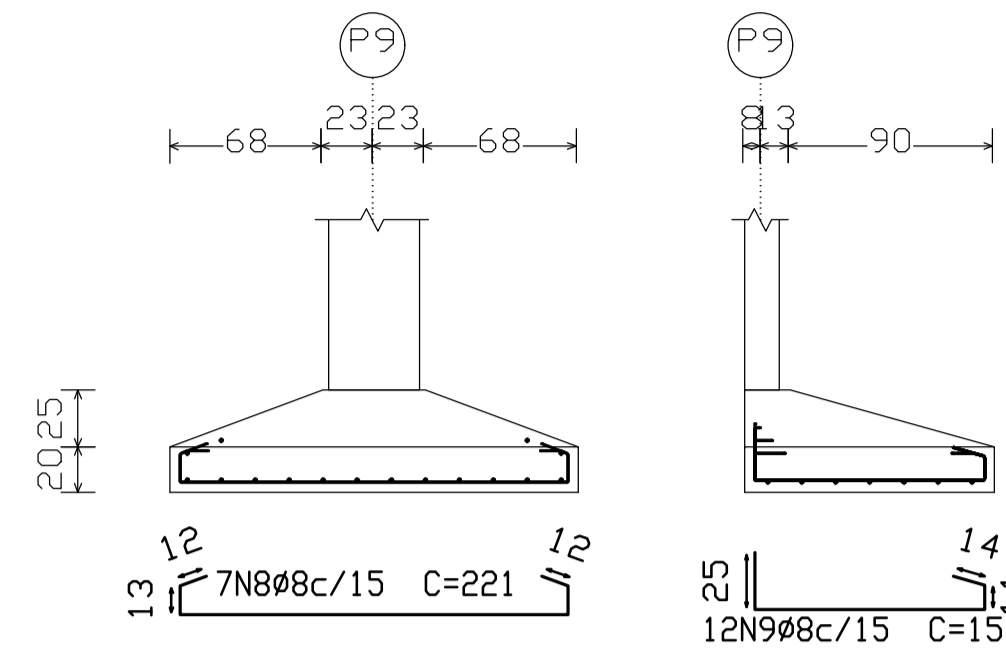
S6



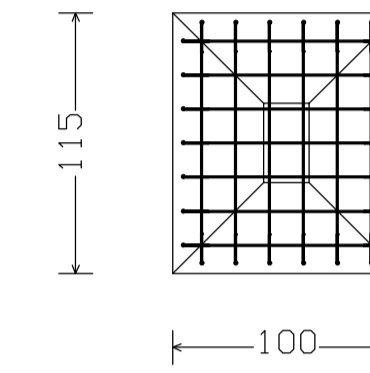
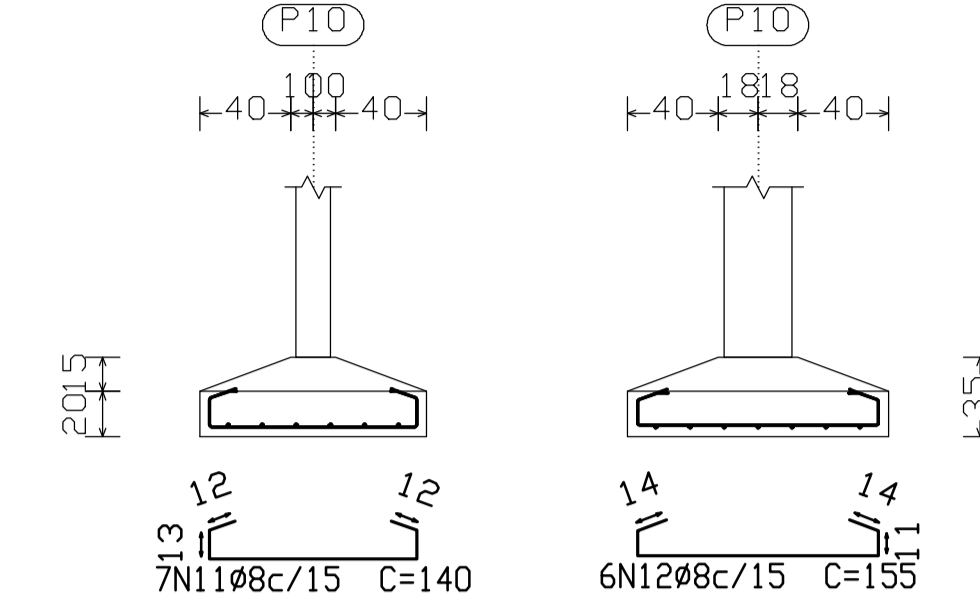
S7



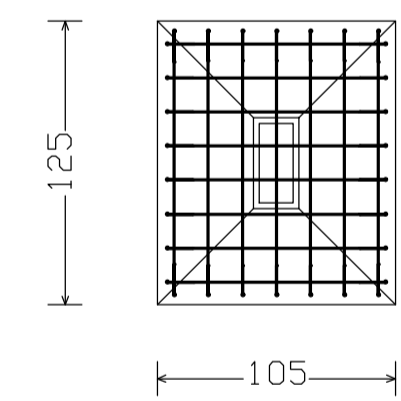
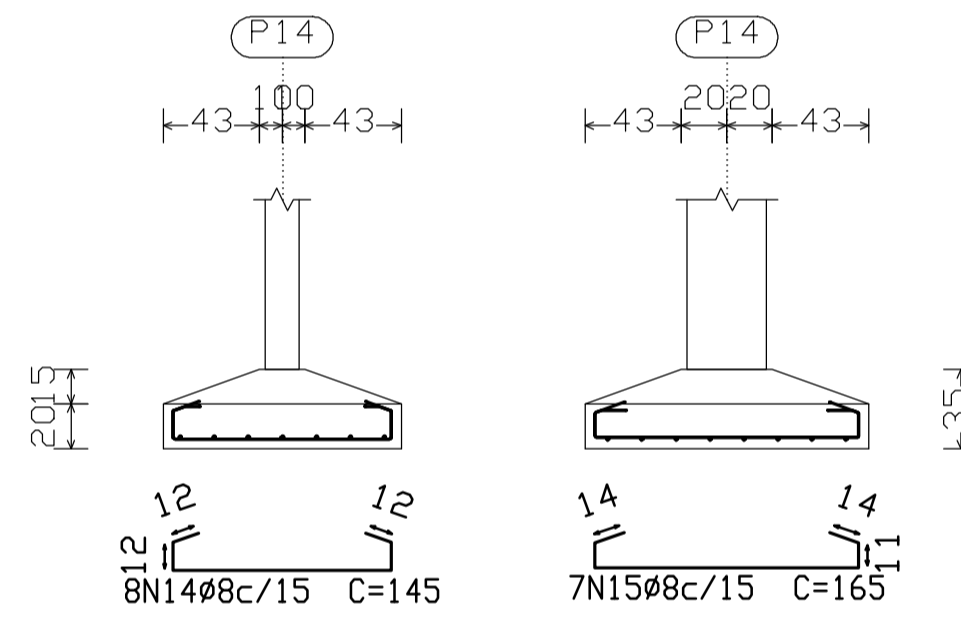
S9



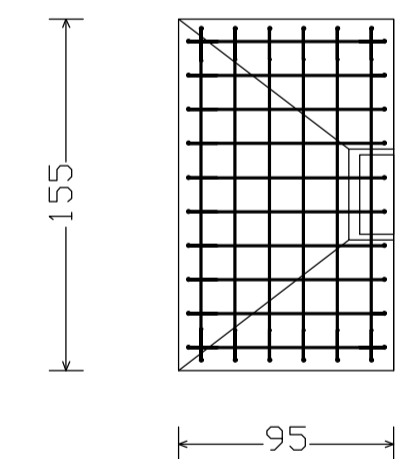
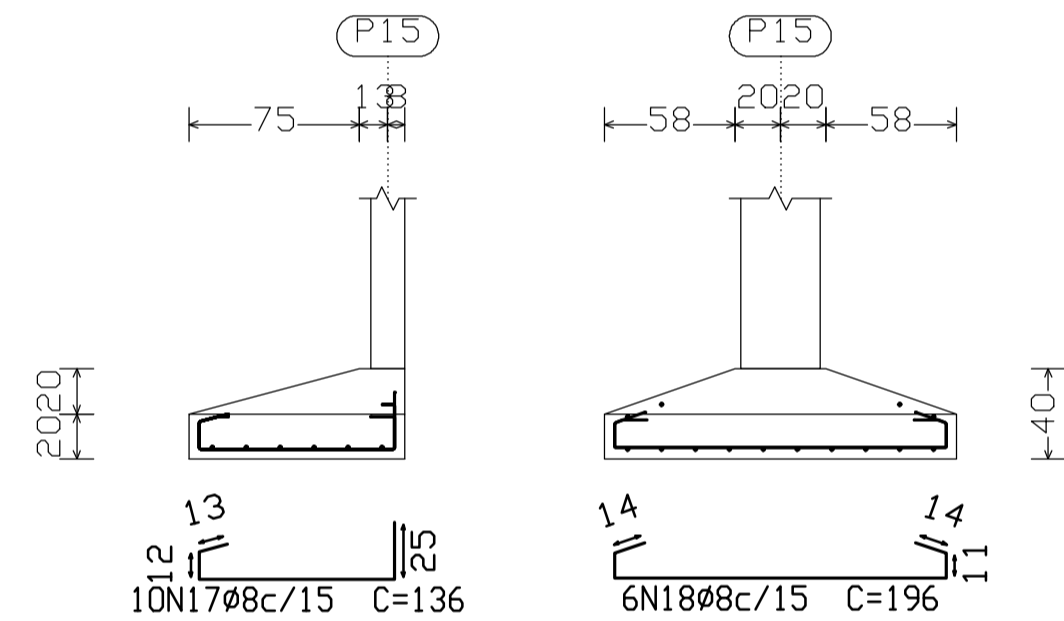
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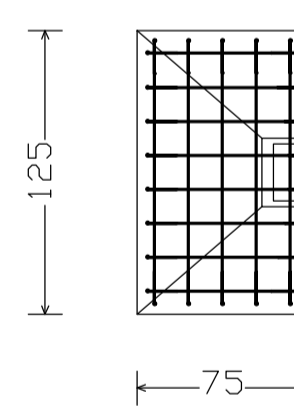
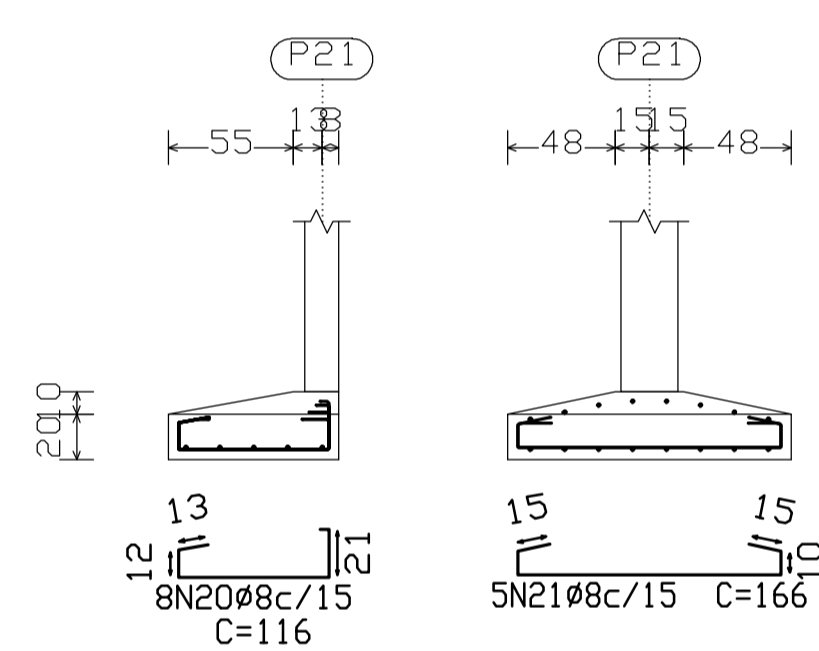
S14



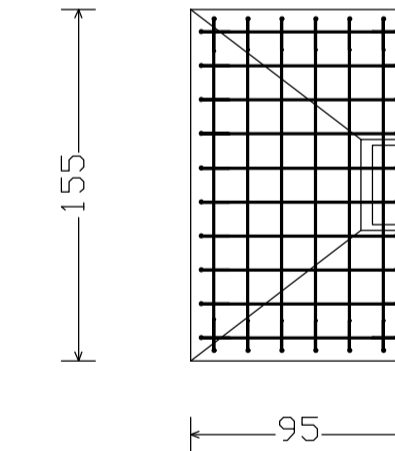
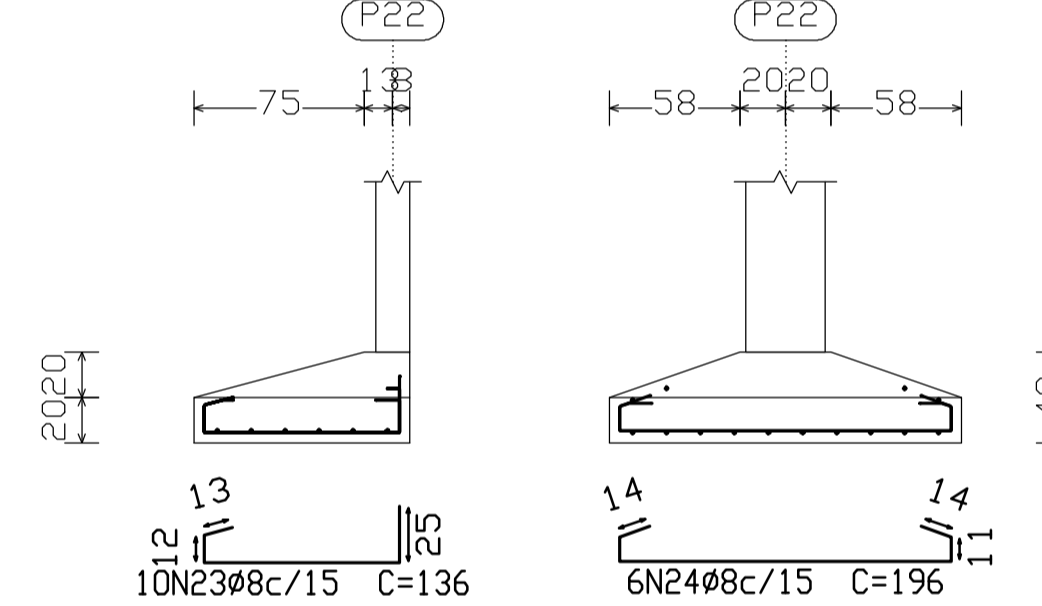
S15



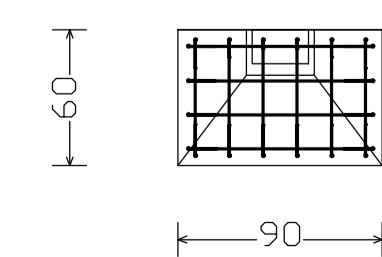
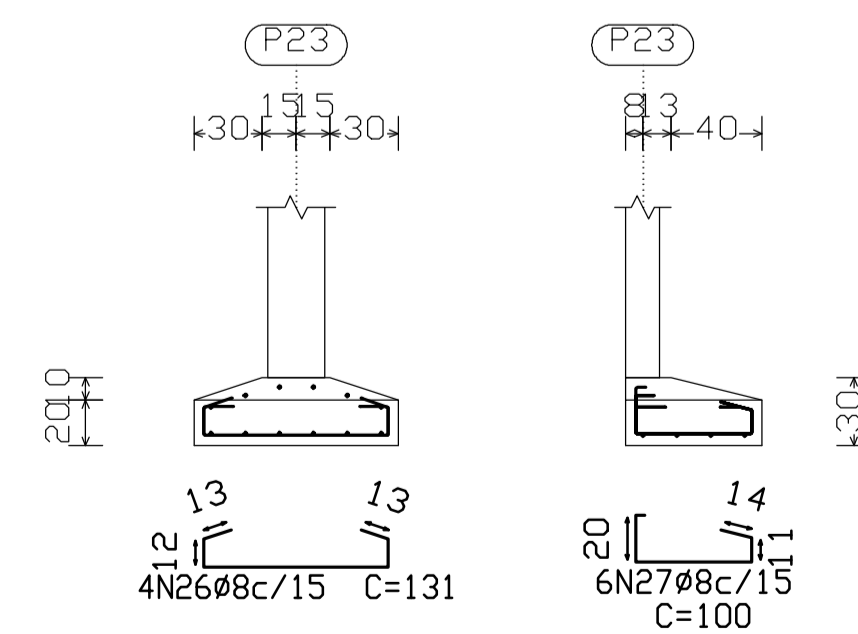
S21



S22

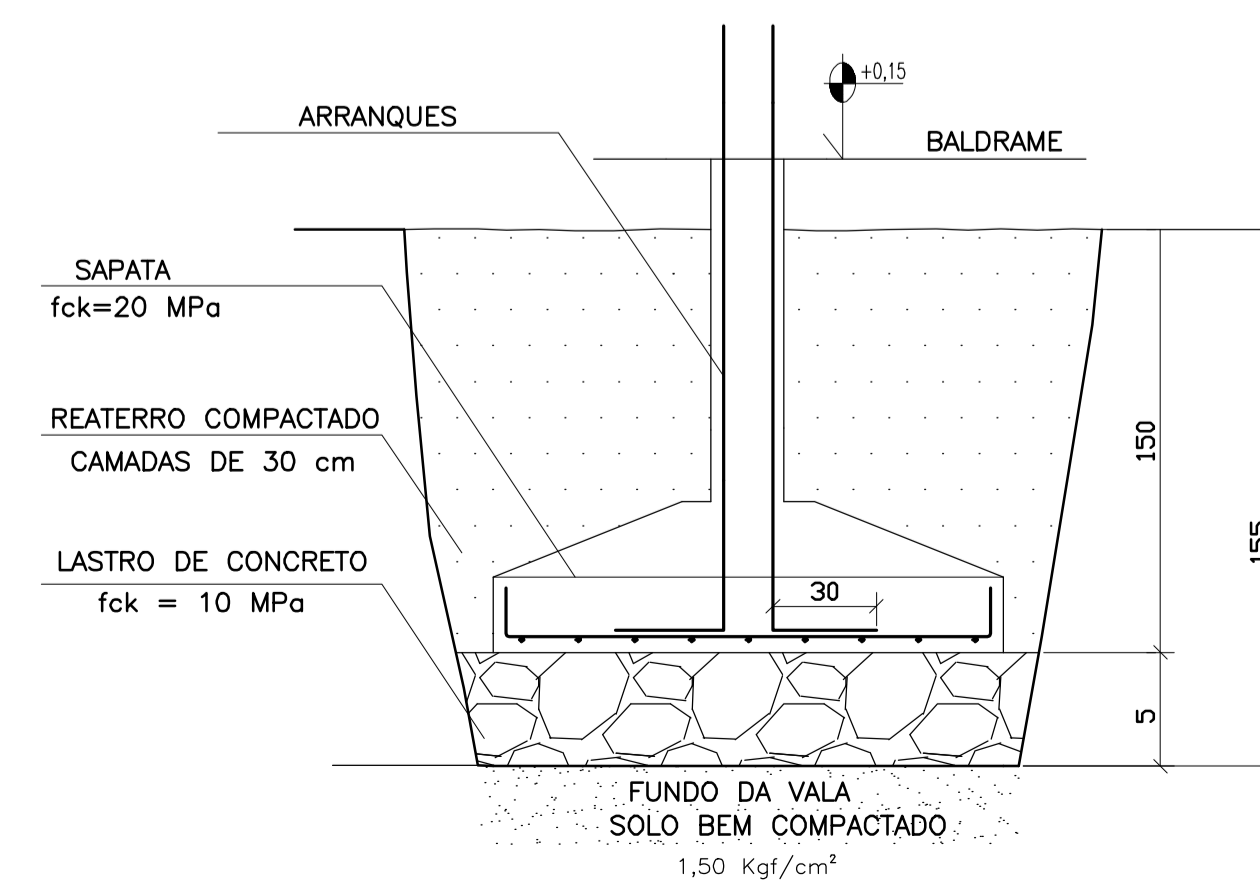


S23



DETALHE TÍPICO 01
REFORÇO FUNDO DAS SAPATAS

ESCALA 1:20
DIMENSÕES EM cm



| Elemento | Pos | Diam | Q | Dob | Ret | Comp | Total | CA-50-ACA-60-B | CA-50-ACA-60-B | |
|----------|-----|-------|------|------|------|------|-----------|----------------|----------------|-----|
| | | (cm) | (cm) | (cm) | (cm) | (cm) | (cm) | (kg) | (kg) | |
| S6 | 1 | Ø8 | 5 | 166 | 166 | 830 | 3.3 | | | |
| | 2 | Ø8 | 8 | 115 | 115 | 920 | 3.6 | | | |
| | 3 | Ø10 | 4 | 30 | 68 | 98 | 3.92 | 2.5 | | |
| | | | | | | | Total+10% | 10.3 | | |
| S7 | 4 | Ø8 | 7 | 221 | 221 | 1547 | 6.1 | | | |
| | 5 | Ø8 | 12 | 151 | 151 | 1812 | 7.1 | | | |
| | 6 | Ø10 | 2 | 30 | 83 | 113 | 2.26 | 1.4 | | |
| | 7 | Ø12.5 | 4 | 30 | 94 | 124 | 4.96 | 4.9 | | |
| | | | | | | | Total+10% | 21.5 | | |
| S9 | 8 | Ø8 | 7 | 221 | 221 | 1547 | 6.1 | | | |
| | 9 | Ø8 | 12 | 151 | 151 | 1812 | 7.1 | | | |
| | 10 | Ø16 | 4 | 30 | 109 | 139 | 5.56 | 8.7 | | |
| | | | | | | | Total+10% | 24.1 | | |
| S10 | 11 | Ø8 | 7 | 140 | 140 | 980 | 3.8 | | | |
| | 12 | Ø8 | 6 | 155 | 155 | 930 | 3.7 | | | |
| | 13 | Ø10 | 4 | 30 | 73 | 103 | 4.12 | 2.6 | | |
| | | | | | | | Total+10% | 11.1 | | |
| S14 | 14 | Ø8 | 8 | 145 | 145 | 1160 | 4.6 | | | |
| | 15 | Ø8 | 7 | 165 | 165 | 1195 | 4.5 | | | |
| | 16 | Ø10 | 6 | 30 | 73 | 103 | 6.18 | 3.9 | | |
| | | | | | | | Total+10% | 14.3 | | |
| S15 | 17 | Ø8 | 10 | 136 | 136 | 1360 | 5.3 | | | |
| | 18 | Ø8 | 6 | 196 | 196 | 1176 | 4.6 | | | |
| | 19 | Ø10 | 6 | 30 | 78 | 108 | 6.48 | 4.1 | | |
| | | | | | | | Total+10% | 15.4 | | |
| S21 | 20 | Ø8 | 8 | 116 | 116 | 928 | 3.6 | | | |
| | 21 | Ø8 | 5 | 166 | 166 | 830 | 3.3 | | | |
| | 22 | Ø10 | 4 | 30 | 68 | 98 | 3.92 | 2.5 | | |
| | | | | | | | Total+10% | 10.3 | | |
| S22 | 23 | Ø8 | 10 | 136 | 136 | 1360 | 5.3 | | | |
| | 24 | Ø8 | 6 | 196 | 196 | 1176 | 4.6 | | | |
| | 25 | Ø10 | 4 | 30 | 78 | 108 | 4.32 | 2.7 | | |
| | | | | | | | Total+10% | 13.9 | | |
| S23 | 26 | Ø8 | 4 | 131 | 131 | 524 | 2.1 | | | |
| | 27 | Ø8 | 6 | 100 | 100 | 600 | 2.4 | | | |
| | 28 | Ø10 | 4 | 30 | 68 | 98 | 3.92 | 2.5 | | |
| | | | | | | | Total+10% | 7.7 | | |
| | | | | | | | | Ø8: | 89.3 | 0.0 |
| | | | | | | | | Ø10: | 24.3 | 0.0 |
| | | | | | | | | Ø12.5: | 5.4 | 0.0 |
| | | | | | | | | Ø16: | 9.6 | 0.0 |
| | | | | | | | | Total: | 128.6 | 0.0 |

QUADROS FERROS / LEGENDAS

| Resumo Aço Fundação | Comp. total (m) | Peso+10% (kg) | Total |
|---------------------|-----------------|---------------|-------|
| CA-50-A Ø8 | 206.5 | 89 | |
| Ø10 | 35.1 | 24 | |
| Ø12.5 | 5.0 | 5 | |
| Ø16 | 5.6 | 10 | 128 |

NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, $p=1,5 \text{ Kgf/cm}^2$.
- CONCRETO ESTRUTURAL DAS SAPATAS: $f_{ck}=18,0 \text{ MPa}$
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: $f_{ck}=20,0 \text{ MPa}$.
- COBRIMENTO FERRAGEM SAPATAS = 3 cm
- ANTES DA CONCRETAGEM DAS SAPATAS, COMPACTAR O SOLO DO FUNDO DAS VALAS E EXECUTAR UM LASTRO DE CONCRETO MAGRO ESPESURA DE 5 cm E $f_{ck} = 10 \text{ MPa}$, CONFORME DETALHE TÍPICO 01.

PREFEITURA MUNICIPAL DE MARLIÉRIA-MG
PRAÇA J.K., Nº106, CENTRO, CNPJ:16.796.872/0001-48



PREFEITO: GERALDO MAGELA BORGES DE CASTRO
SECRETÁRIO OBRAS: HENRIQUE DE CASTRO NETO

RESPONSÁVEL TÉCNICO:

FREDERICO HORTA MIRANDA
ENGº CIVIL - CREA 56.354/D

PROJETO: PROJETO ESTRUTURAL

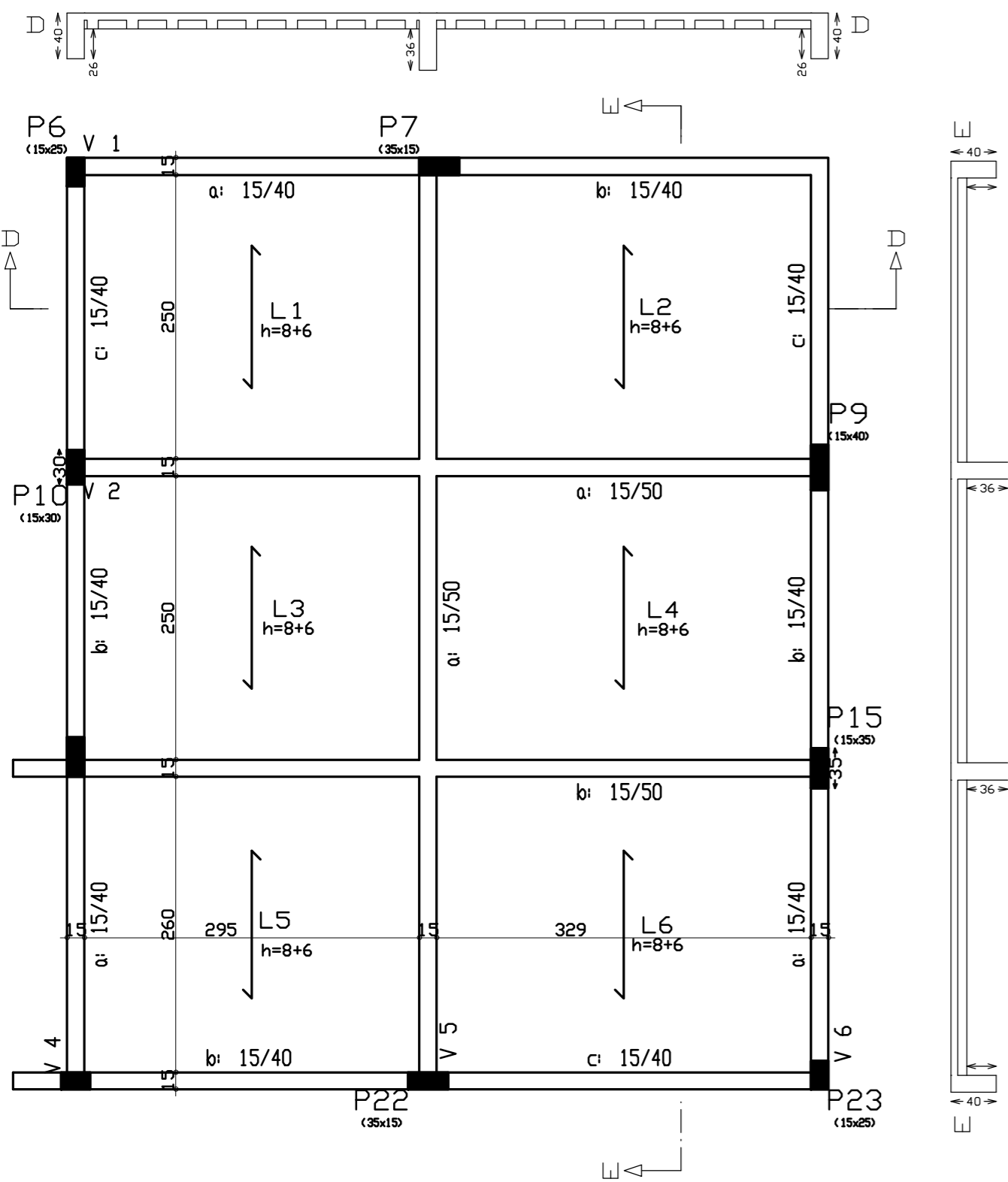
AMPLIAÇÃO DA ESCOLA MUNICIPAL JOSÉ PEDRO DA SILVA, DISTRITO DE CAVA GRANDE

CONTEÚDO:
- ARMAÇÃO SAPATAS

| | | |
|----------------------|---------------------|---------------------|
| DESENHO: VIVIANE | ESCALA: INDICADAS | PROJETO Nº: 11/2015 |
| CONFERIDO: FREDERICO | REVISÃO Nº: 00 | FRANCHA: |
| APROVADO: FREDERICO | DATA: SETEMBRO/2018 | 03/05 |

FORMA LAJE COBERTURA +3,05

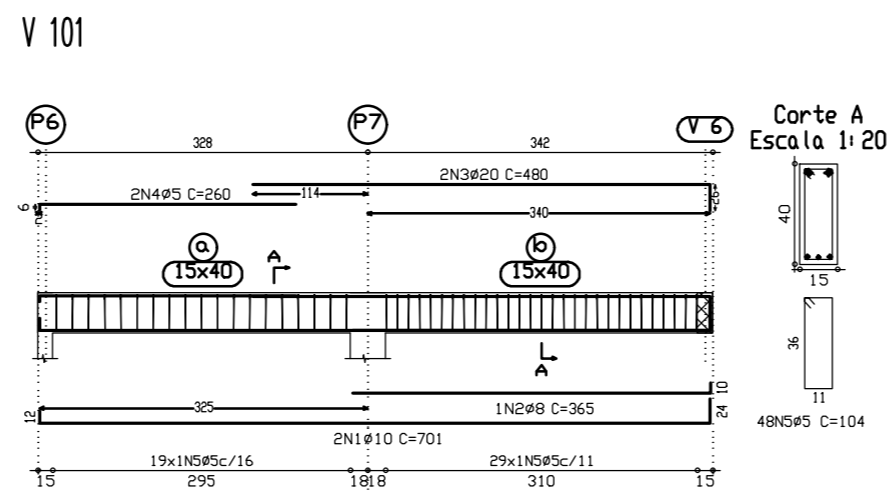
ESCALA 1:50
DIMENSÕES EM cm



| Térreo - Superfície total: 55.63 m ² | | | |
|-------------------------------------------------|--------------------------|--------------------------|-------------|
| Elemento | Formas (m ²) | Volume (m ³) | Barras (kg) |
| LAJES | 47.46 | 3.80 | |
| Vigas: fundo | 7.74 | 3.65 | 376 |
| Forma lateral | 35.48 | | |
| Pilares (Sup. Formas) | 26.90 | 1.38 | 239 |
| Total | 117.58 | 8.83 | 615 |
| índices (por m ²) | 2.114 | 0.159 | 11.06 |

ARMAÇÃO VIGAS LAJE COBERTURA

ESCALA 1:75
DIMENSÕES EM cm

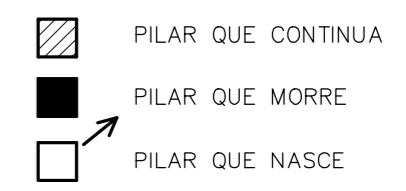


| Elemento | Pos. | Diam. | Q. | Dob. (cm) | Ret. (cm) | Dob. (cm) | Comp. (cm) | Total (cm) | CA-50-A (kg) | CA-60-B (kg) | |
|-------------------|------|-------|----|-----------|-----------|-----------|------------|------------|---------------|--------------|-------------|
| V 101 | 1 | Ø10 | 2 | 12 | 665 | 24 | 701 | 1402 | 8.8 | | |
| | 2 | Ø8 | 1 | | 355 | 10 | 365 | 365 | 1.4 | | |
| | 3 | Ø20 | 2 | | 454 | 26 | 480 | 960 | 23.7 | | |
| | 4 | Ø5 | 2 | 6 | 254 | | 260 | 520 | | 0.8 | |
| | 5 | Ø5 | 48 | | | | 104 | 4992 | | 7.8 | |
| Total+10%: | | | | | | | | | 37.3 | 9.5 | |
| V 102 | 6 | Ø25 | 2 | 33 | 665 | 33 | 731 | 1462 | 57.4 | | |
| | 7 | Ø5 | 2 | 9 | 665 | 9 | 683 | 1366 | | 2.1 | |
| | 8 | Ø6.3 | 43 | | | | 127 | 5461 | 13.5 | | |
| Total+10%: | | | | | | | | | 78.0 | 2.3 | |
| V 103 | 9 | Ø25 | 2 | 33 | 665 | 33 | 731 | 1462 | 57.4 | | |
| | 10 | Ø8 | 2 | | 110 | 10 | 120 | 220 | 0.9 | | |
| | 11 | Ø5 | 2 | | 711 | 9 | 720 | 1440 | | 2.3 | |
| | 12 | Ø6.3 | 54 | | | | 127 | 6858 | 17.0 | | |
| Total+10%: | | | | | | | | | 82.8 | 2.5 | |
| V 104 | 13 | Ø8 | 2 | | 710 | 10 | 720 | 1440 | 5.7 | | |
| | 14 | Ø10 | 1 | | 658 | 12 | 670 | 670 | 4.2 | | |
| | 15 | Ø10 | 2 | | 713 | 12 | 725 | 1450 | 9.1 | | |
| | 16 | Ø8 | 1 | | 450 | 10 | 460 | 460 | 1.8 | | |
| | 17 | Ø5 | 41 | | | | 104 | 4264 | | 6.7 | |
| Total+10%: | | | | | | | | | 22.9 | 7.4 | |
| V 107 | 18 | Ø8 | 2 | 10 | 816 | 10 | 836 | 1672 | 6.6 | | |
| | 19 | Ø8 | 1 | | 295 | | 295 | 295 | 1.2 | | |
| | 20 | Ø8 | 2 | 10 | 445 | | 455 | 910 | 3.6 | | |
| | 21 | Ø20 | 2 | | 409 | 26 | 435 | 870 | 21.5 | | |
| | 22 | Ø12.5 | 1 | | 345 | 15 | 360 | 360 | 3.5 | | |
| 23 | Ø5 | 42 | | | | 104 | 4368 | | 6.9 | | |
| Total+10%: | | | | | | | | | 40.0 | 7.6 | |
| V 106 | 24 | Ø20 | 2 | 26 | 816 | 26 | 868 | 1736 | 42.9 | | |
| | 25 | Ø6.3 | 1 | 8 | 816 | 8 | 832 | 832 | 2.1 | | |
| | 26 | Ø5 | 2 | 8 | 816 | 8 | 832 | 1664 | | 2.6 | |
| 27 | Ø5 | 54 | | | | 124 | 6696 | | 10.5 | | |
| Total+10%: | | | | | | | | | 49.5 | 14.4 | |
| V 105 | 28 | Ø8 | 2 | 10 | 816 | 10 | 836 | 1672 | 6.6 | | |
| | 29 | Ø6.3 | 2 | 8 | 816 | 8 | 832 | 1664 | 4.1 | | |
| | 30 | Ø8 | 1 | | 500 | | 500 | 500 | 2.0 | | |
| | 31 | Ø5 | 41 | | | | 104 | 4264 | | 6.7 | |
| Total+10%: | | | | | | | | | 14.0 | 7.4 | |
| | | | | | | | | | Ø5: | 0.0 | 51.1 |
| | | | | | | | | | Ø6.3: | 40.4 | 0.0 |
| | | | | | | | | | Ø8: | 32.8 | 0.0 |
| | | | | | | | | | Ø10: | 24.3 | 0.0 |
| | | | | | | | | | Ø12.5: | 3.8 | 0.0 |
| | | | | | | | | | Ø20: | 97.0 | 0.0 |
| | | | | | | | | | Ø25: | 126.2 | 0.0 |
| | | | | | | | | | Total: | 324.5 | 51.1 |

| Resumo Aço | Comp. total (m) | Peso+10% (kg) | Total |
|--------------|-----------------|---------------|------------|
| Térreo Vigas | | | |
| CA-50-A Ø6.3 | 148.2 | 40 | |
| Ø8 | 75.3 | 33 | |
| Ø10 | 35.2 | 24 | |
| Ø12.5 | 3.6 | 4 | |
| Ø20 | 35.7 | 97 | |
| Ø25 | 29.2 | 126 | 324 |
| CA-60-B Ø5 | 295.7 | 51 | 51 |
| Total | | | 375 |

NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, p=0,5 Kgf/cm².
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: fck=20,0 MPa.



PREFEITURA MUNICIPAL DE MARLIÉRIA-MG
PRAÇA J.K., N°106, CENTRO, CNPJ:16.796.872/0001-48



PREFEITO: GERALDO MAGELA BORGES DE CASTRO
SECRETÁRIO OBRAS: HENRIQUE DE CASTRO NETO

RESPONSÁVEL TÉCNICO:
FREDERICO HORTA MIRANDA
ENG° CIVIL - CREA 56.354/D

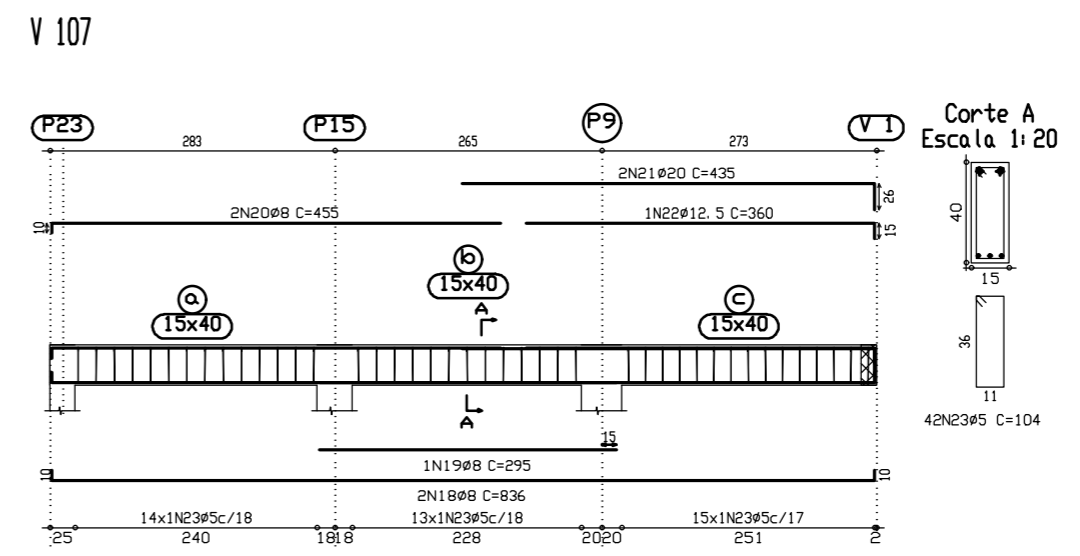
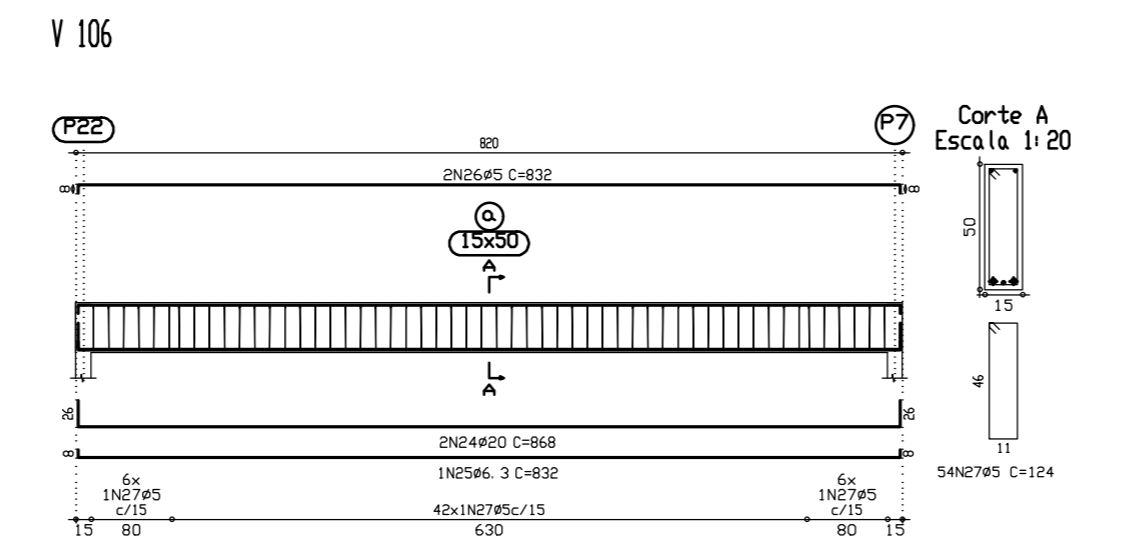
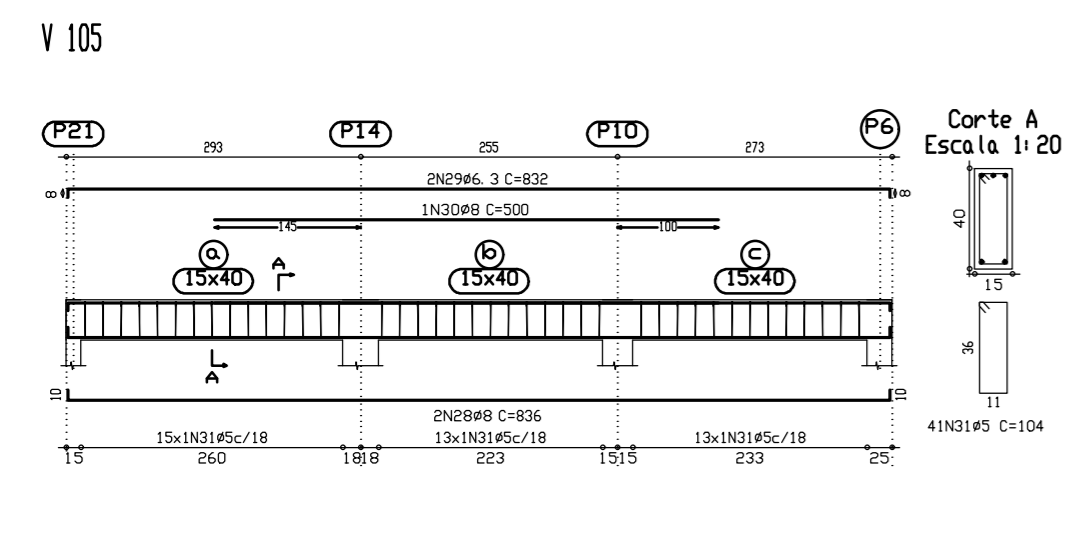
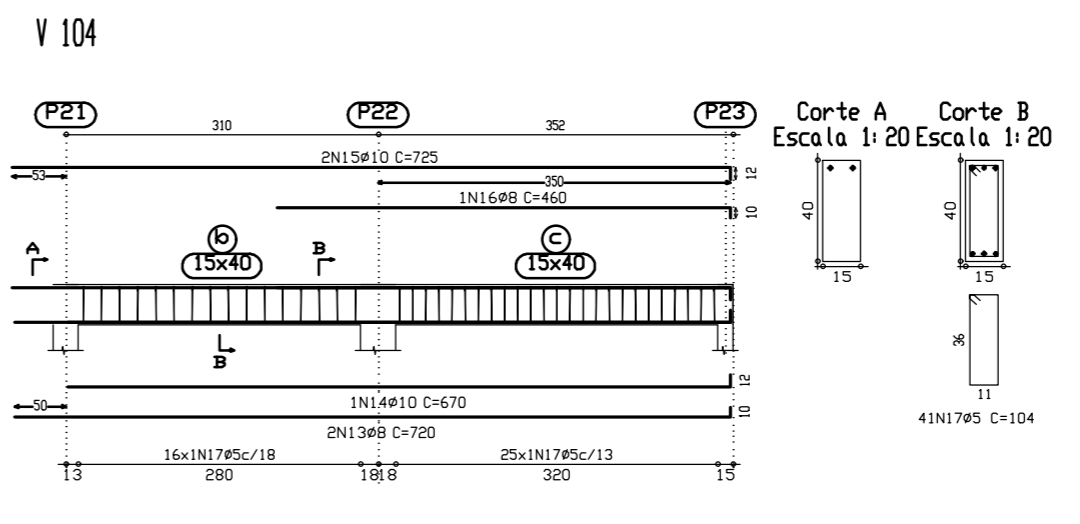
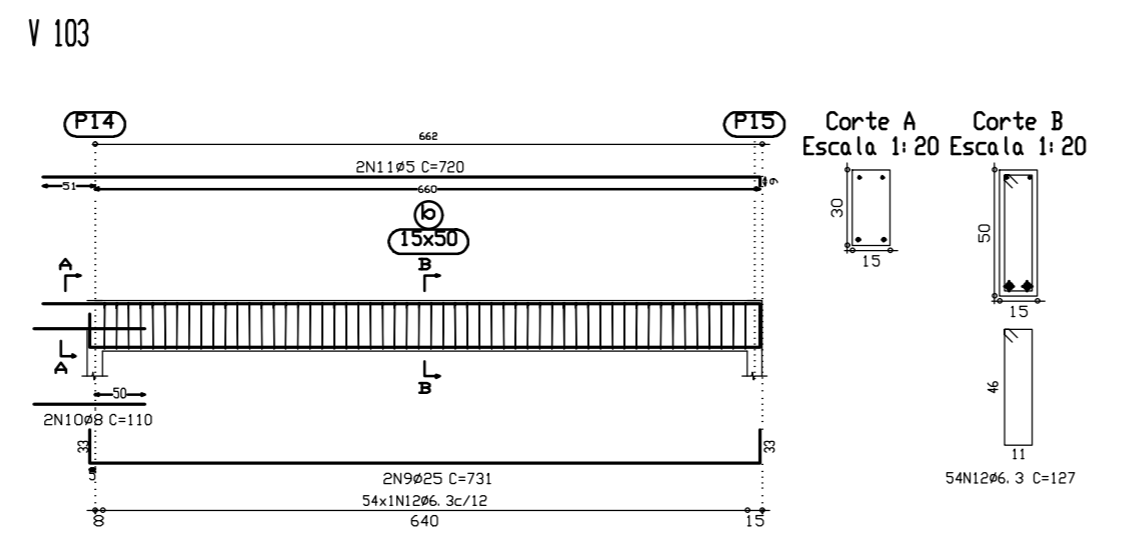
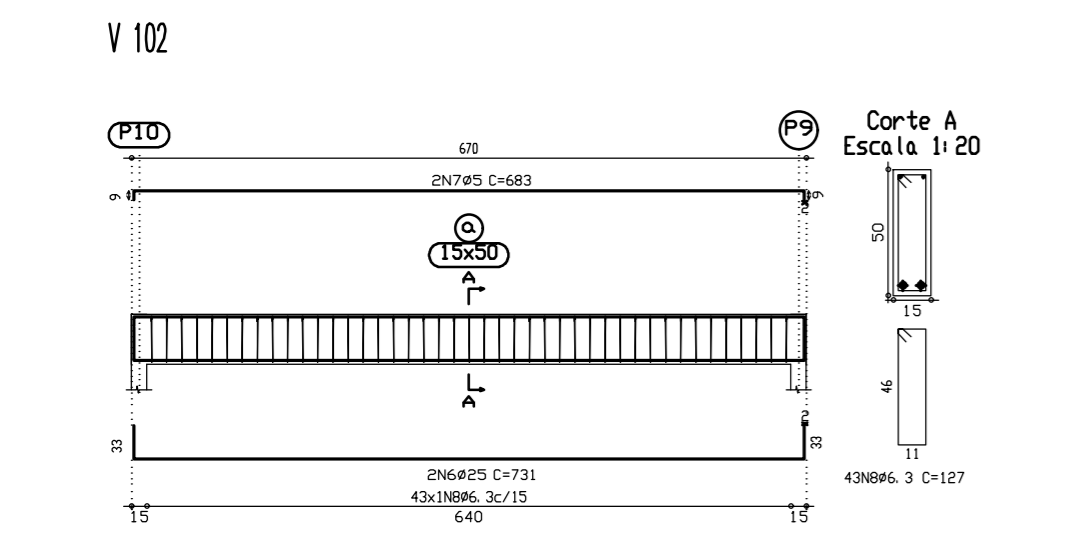
PROJETO: PROJETO ESTRUTURAL

AMPLIAÇÃO DA ESCOLA MUNICIPAL JOSÉ PEDRO DA SILVA, DISTRITO DE CAVA GRANDE

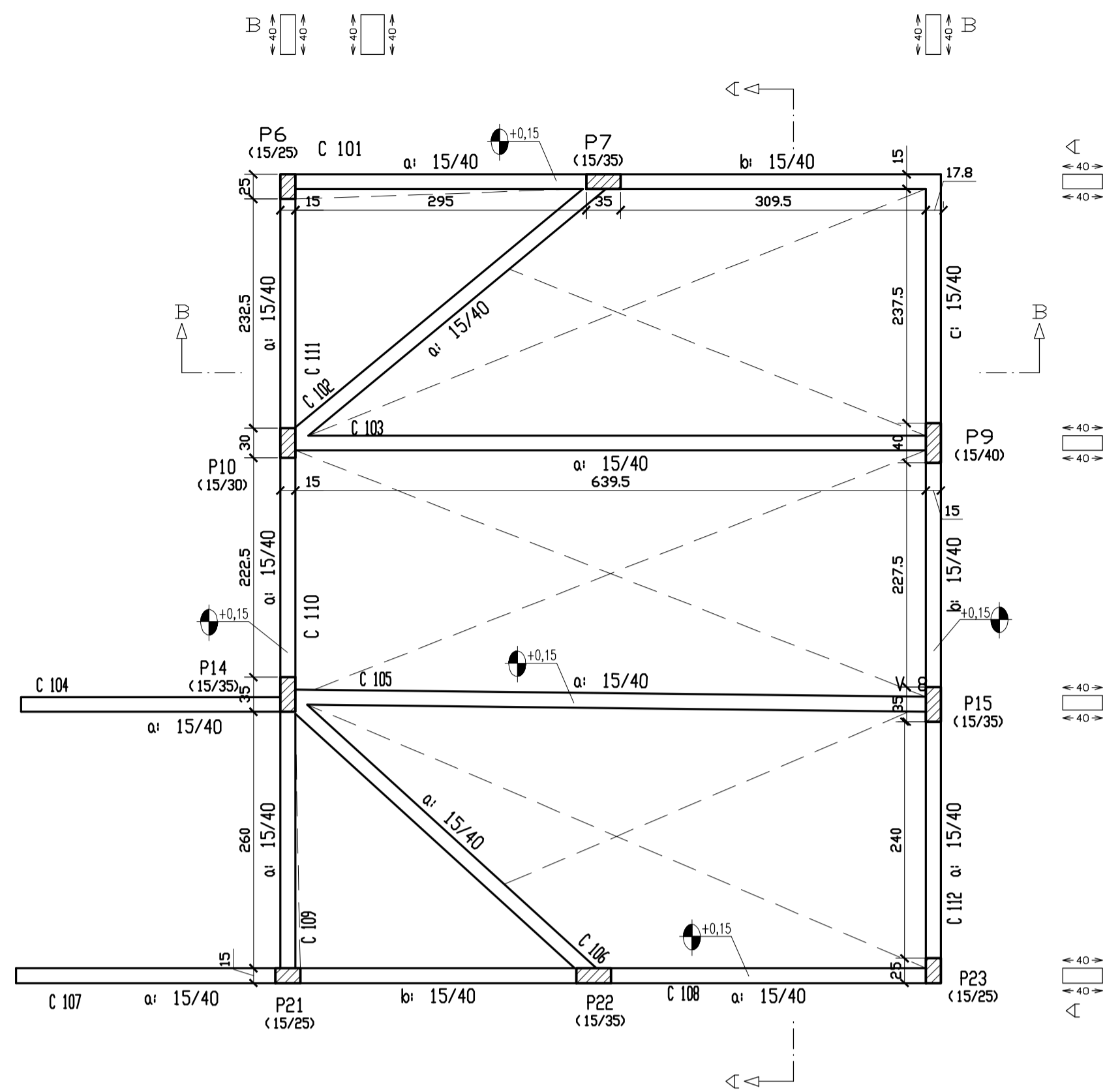
CONTEÚDO:
- FORMA LAJE COBERTURA
- ARMAÇÃO VIGAS LAJE COBERTURA

| | | |
|----------------------|---------------------|---------------------|
| DESENHO: VIVIANE | ESCALA: INDICADAS | PROJETO N°: 11/2015 |
| CONFERIDO: FREDERICO | REVISÃO N°: 00 | PRANCHA: |
| APROVADO: FREDERICO | DATA: SETEMBRO/2018 | 04/05 |

ESTE DESENHO É PROPRIEDADE DE FREDERICO HORTA MIRANDA E DO CONTRATANTE. NÃO PODEM SER ALTERADO, COPIADO OU USADO SEM AUTORIZAÇÃO POR ESCRITO.



FORMA BALDRAME
ESCALA 1:50
DIMENSÕES EM cm



| Resumo Aço Baldrame Vigas | Comp. total (m) | Peso+10% (kg) | Total |
|---------------------------|-----------------|---------------|------------|
| CA-50-AØ8 | 76.7 | 33 | |
| Ø10 | 191.6 | 132 | 165 |
| CA-60-BØ5 | 318.0 | 55 | 55 |
| Total | | | 220 |

ARMAÇÃO CINTAS
ESCALA VIGA 1:75
DIMENSÕES EM cm

| Elemento | Pos | Diam | Q | Dob | Retal | Dob | Comp | Tota | CA-50 | ACA-60 | |
|----------|-----|------|----|------|-------|------|------|------|--------|--------|-------|
| | | | | (cm) | (cm) | (cm) | (cm) | (cm) | (kg) | (kg) | |
| C 101 | 1 | Ø8 | 2 | 10 | 665 | 10 | 685 | 1370 | 5.4 | | |
| | 2 | Ø8 | 2 | 10 | 665 | 10 | 685 | 1370 | 5.4 | | |
| | 3 | Ø5 | 35 | | | | 104 | 3640 | | 5.7 | |
| Tota+10% | | | | | | | | | 11.9 | 6.3 | |
| C 102 | 1 | Ø10 | 2 | 51 | 432 | 52 | 535 | 1070 | 6.7 | | |
| | 2 | Ø10 | 2 | 51 | 432 | 52 | 535 | 1070 | 6.7 | | |
| | 3 | Ø10 | 2 | 51 | 432 | 52 | 535 | 1070 | 6.7 | | |
| | 4 | Ø5 | 23 | | | | 104 | 2392 | | 3.8 | |
| Tota+10% | | | | | | | | | 22.1 | 4.2 | |
| C 103 | 1 | Ø10 | 2 | 50 | 664 | 51 | 765 | 1530 | 9.6 | | |
| | 2 | Ø10 | 2 | 50 | 664 | 51 | 765 | 1530 | 9.6 | | |
| | 3 | Ø10 | 2 | 50 | 664 | 51 | 765 | 1530 | 9.6 | | |
| | 4 | Ø5 | 36 | | | | 104 | 3744 | | 5.9 | |
| Tota+10% | | | | | | | | | 31.7 | 6.5 | |
| C 104 | 5 | Ø8 | 2 | 65 | 25 | 80 | 180 | 160 | 0.7 | 0.3 | |
| | 6 | Ø5 | 2 | 64 | 16 | 80 | 160 | 160 | 0.8 | 0.3 | |
| Tota+10% | | | | | | | | | 0.8 | 0.3 | |
| C 105 | 5 | Ø8 | 2 | 65 | 25 | 80 | 180 | 160 | 0.7 | 0.3 | |
| | 6 | Ø5 | 2 | 64 | 16 | 80 | 160 | 160 | 0.8 | 0.3 | |
| Tota+10% | | | | | | | | | 0.8 | 0.3 | |
| C 106 | 7 | Ø10 | 2 | 50 | 665 | 50 | 765 | 1530 | 9.6 | | |
| | 8 | Ø10 | 2 | 50 | 665 | 50 | 765 | 1530 | 9.6 | | |
| | 9 | Ø5 | 36 | | | | 104 | 3744 | | 5.9 | |
| Tota+10% | | | | | | | | | 21.1 | 6.5 | |
| C 107 | 5 | Ø10 | 2 | 52 | 436 | 52 | 540 | 1080 | 6.8 | | |
| | 6 | Ø10 | 2 | 52 | 436 | 52 | 540 | 1080 | 6.8 | | |
| | 7 | Ø10 | 2 | 52 | 436 | 52 | 540 | 1080 | 6.8 | | |
| Tota+10% | | | | | | | | | 22.4 | 4.2 | |
| C 108 | 10 | Ø8 | 2 | 383 | 12 | 395 | 790 | 3.1 | 1.2 | 3.6 | |
| | 11 | Ø5 | 2 | 382 | 8 | 390 | 780 | 3.1 | 1.2 | 3.6 | |
| | 12 | Ø5 | 22 | | | | 104 | 2288 | | 3.4 | |
| Tota+10% | | | | | | | | | 3.4 | 5.3 | |
| C 109 | 9 | Ø10 | 2 | 51 | 365 | 54 | 470 | 940 | 5.9 | | |
| | 10 | Ø10 | 2 | 51 | 365 | 54 | 470 | 940 | 5.9 | | |
| | 11 | Ø5 | 18 | | | | 104 | 1872 | | 2.9 | |
| Tota+10% | | | | | | | | | 13.0 | 3.2 | |
| C 110 | 1 | Ø10 | 2 | 54 | 306 | 50 | 410 | 820 | 5.1 | | |
| | 2 | Ø10 | 2 | 54 | 306 | 50 | 410 | 820 | 5.1 | | |
| | 3 | Ø5 | 15 | | | | 104 | 1560 | | 2.4 | |
| Tota+10% | | | | | | | | | 11.2 | | |
| C 111 | 12 | Ø8 | 2 | 10 | 283 | 10 | 303 | 606 | 2.4 | 0.9 | |
| | 13 | Ø5 | 2 | 8 | 283 | 8 | 299 | 598 | 2.4 | 0.9 | |
| | 14 | Ø5 | 13 | | | | 104 | 1352 | | 2.1 | |
| Tota+10% | | | | | | | | | 2.6 | 3.3 | |
| C 112 | 7 | Ø10 | 2 | 50 | 283 | 52 | 385 | 770 | 4.8 | | |
| | 8 | Ø10 | 2 | 50 | 283 | 52 | 385 | 770 | 4.8 | | |
| | 9 | Ø5 | 13 | | | | 104 | 1352 | | 2.1 | |
| Tota+10% | | | | | | | | | 10.6 | 2.3 | |
| C 112 | 4 | Ø8 | 2 | 12 | 816 | 12 | 840 | 1680 | 6.6 | | |
| | 5 | Ø8 | 2 | 10 | 816 | 10 | 836 | 1672 | 6.6 | | |
| | 6 | Ø5 | 57 | | | | 104 | 5928 | | 9.3 | |
| Tota+10% | | | | | | | | | 14.5 | 10.2 | |
| | | | | | | | | | Ø5: | 0.0 | 54.90 |
| | | | | | | | | | Ø8: | 33.20 | 0.0 |
| | | | | | | | | | Ø10: | 132.10 | 0.0 |
| | | | | | | | | | Total: | 165.30 | 54.90 |

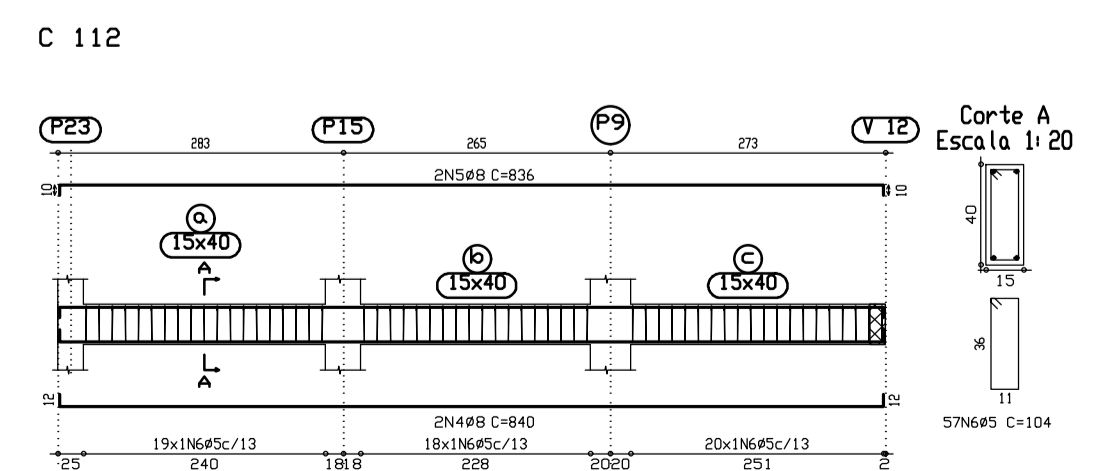
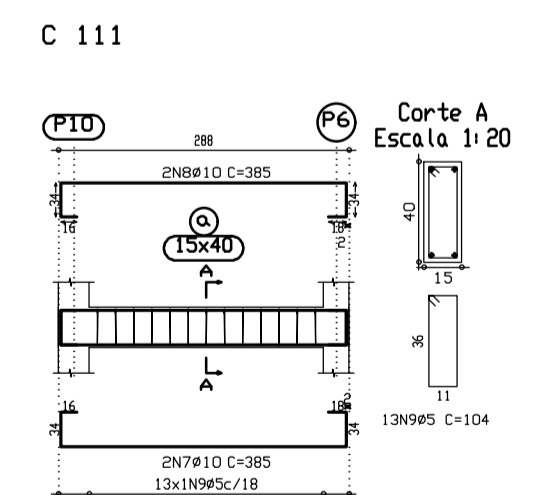
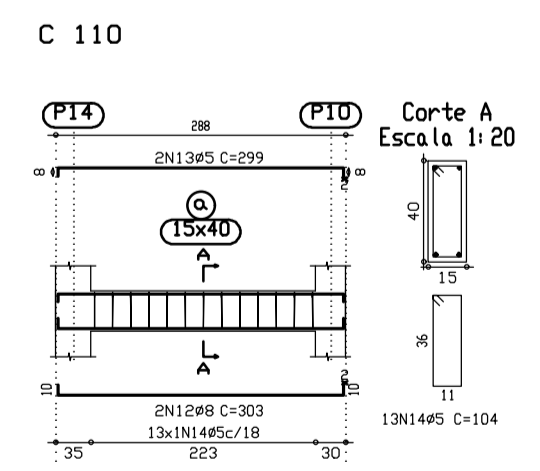
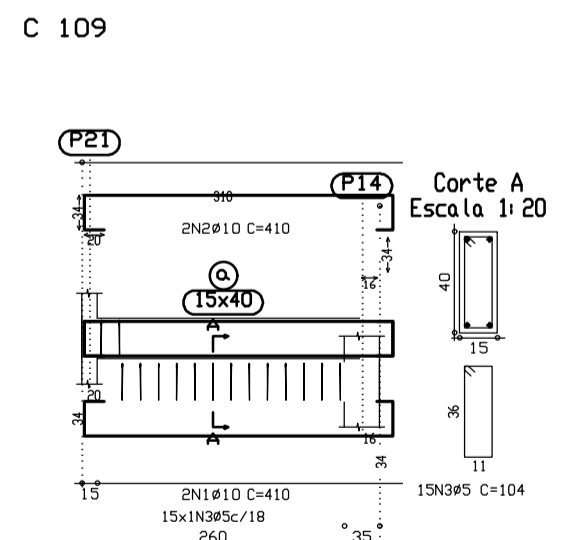
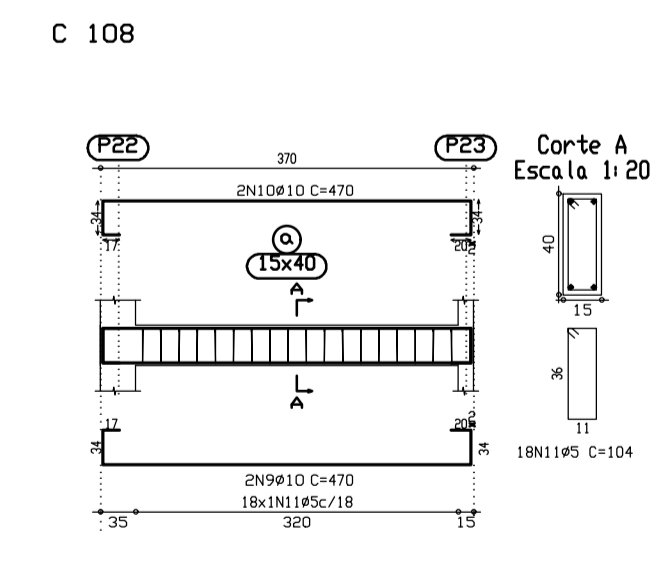
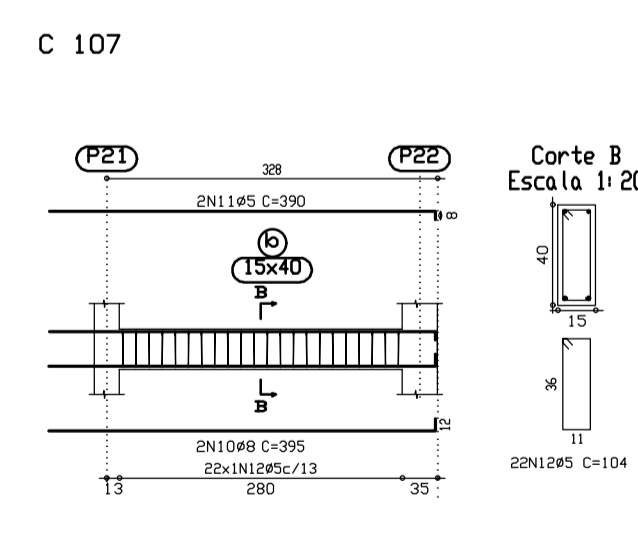
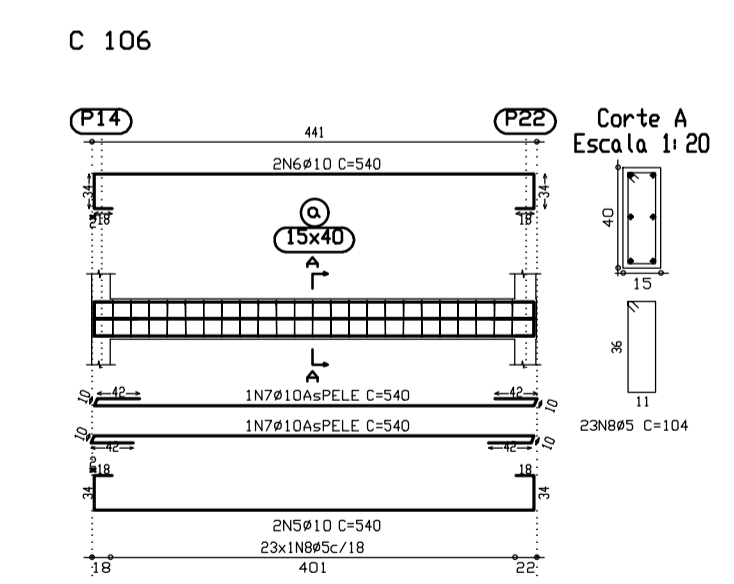
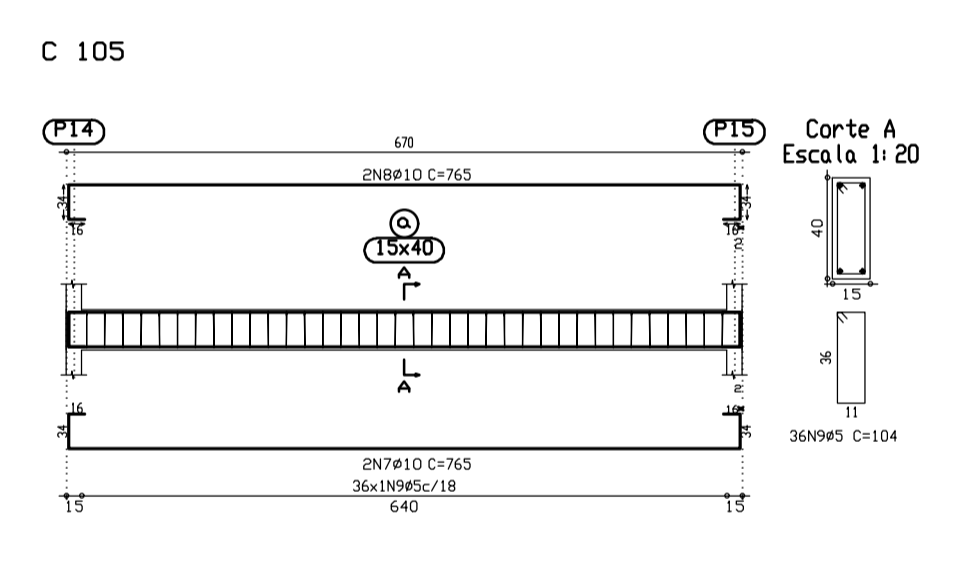
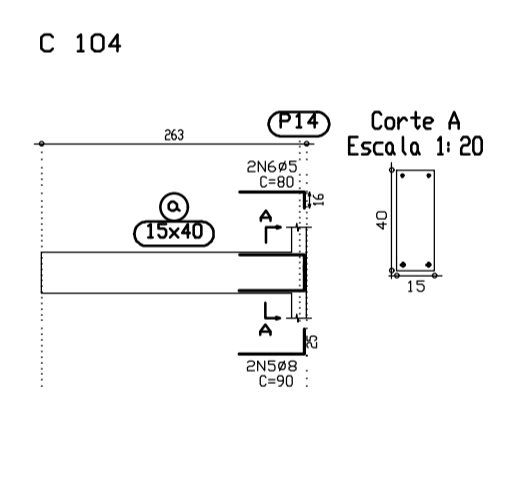
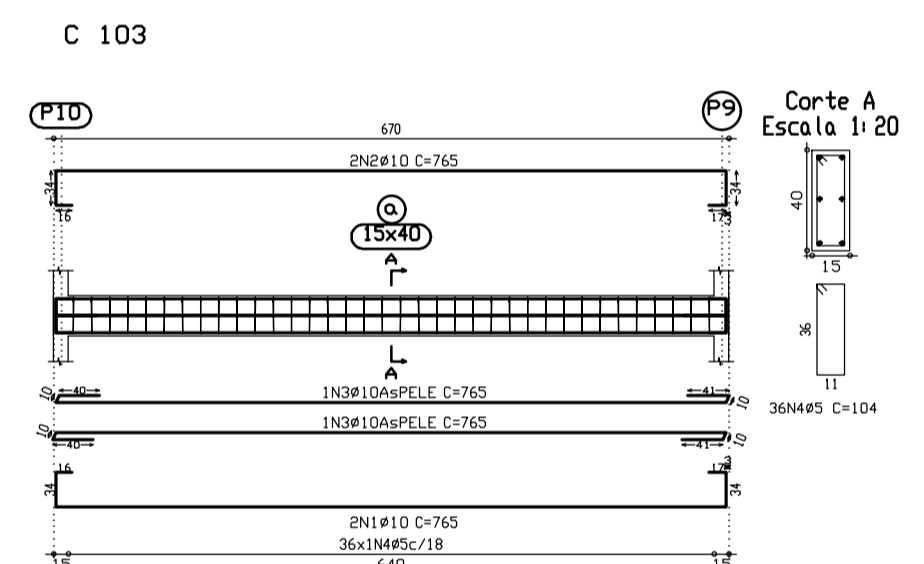
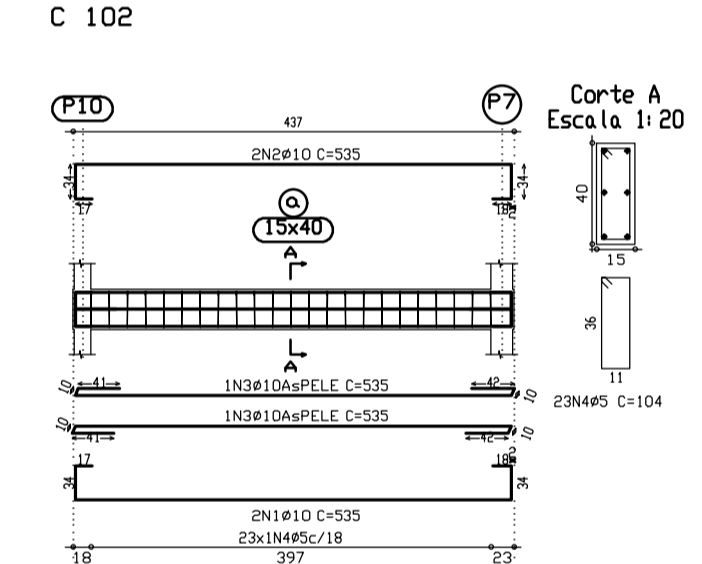
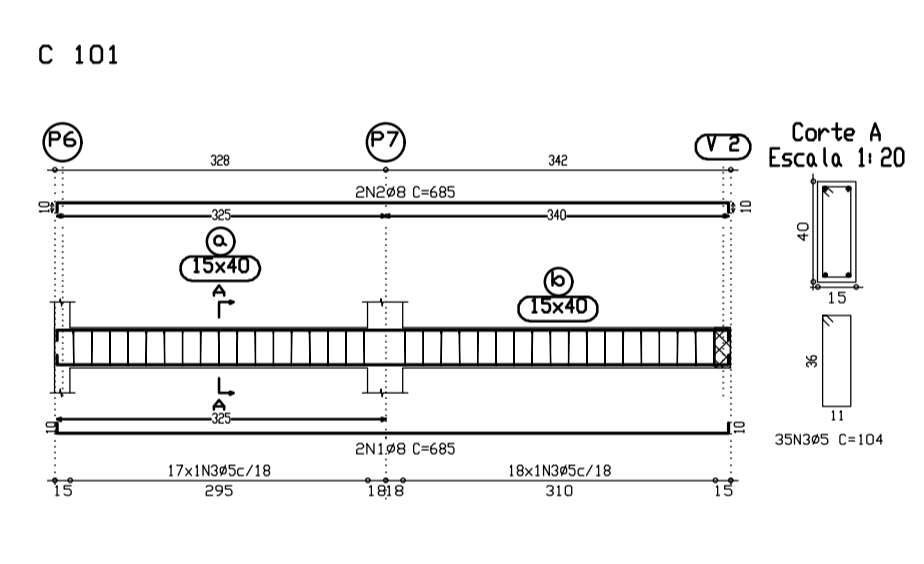
NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, p=2,0 Kgf/cm².
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: fck=20,0 MPa.
- EXECUTAR O REATERRO COMPACTADO EM CAMADAS DE 20 cm, USANDO COMPACTADOR CM-20 OU SIMILAR.
- REBOCAR E PINTAR COM NEUTROL 45 OU SIMILAR O LADO DO MURO EM CONTATO COM O SOLO

CINTAS QUE RECEBEM A PAREDE DE CONTENÇÃO
 CINTAS COTA +0,15

PILAR QUE CONTINUA
 PILAR QUE MORRE
 PILAR QUE NASCE

| Resumo Aço Fundação | Comp. total (m) | Peso+10% (kg) | Total |
|---------------------|-----------------|---------------|-------|
| CA-50-A | 206.5 | 89 | |
| Ø8 | 35.1 | 24 | |
| Ø12.5 | 5.0 | 5 | |
| Ø16 | 5.6 | 10 | 128 |



NOTAS

- PRESSÃO ADMISSÍVEL DO SOLO, p=1,5 Kgf/cm².
- CONCRETO ESTRUTURAL DAS SAPATAS: fck=18,0 MPa
- CONCRETO ESTRUTURAL DAS CINTAS, VIGAS, PILARES, ESCADAS E LAJES: fck=20,0 MPa.
- COBRIMENTO FERRAGEM SAPATAS = 3 cm
- ANTES DA CONCRETAGEM DAS SAPATAS, COMPACTAR O SOLO DO FUNDO DAS VALAS E EXECUTAR UM LASTRO DE CONCRETO MAGRO ESPESURA DE 5 cm E fck = 10 MPa, CONFORME DETALHE TÍPICO 01.

PREFEITURA MUNICIPAL DE MARLIÉRIA-MG
PRAÇA J.K., N.º106, CENTRO, CNPJ:16.796.872/0001-48



PREFEITO: GERALDO MAGELA BORGES DE CASTRO
SECRETÁRIO OBRAS: HENRIQUE DE CASTRO NETO

RESPONSÁVEL TÉCNICO:
FREDERICO HORTA MIRANDA
ENG.º CIVIL - CREA 56.354/D

PROJETO: **PROJETO ESTRUTURAL**

AMPLIAÇÃO DA ESCOLA MUNICIPAL JOSÉ PEDRO DA SILVA, DISTRITO DE CAVA GRANDE

CONTEÚDO:
- FORMA BALDRAME
- ARMAÇÃO CINTAS

| | | |
|----------------------|---------------------|----------------------|
| DESENHO: VIVIANE | ESCALA: INDICADAS | PROJETO N.º: 11/2015 |
| CONFERIDO: FREDERICO | REVISÃO N.º: 00 | FRANCHA: 05/05 |
| APROVADO: FREDERICO | DATA: SETEMBRO/2018 | |