

BAB VI

KESIMPULAN DAN SARAN

6.1 Kesimpulan

Dengan selesainya tugas akhir yang berjudul “Perancangan Struktur Hotel *Grand Seturan*” ini, dapat diambil kesimpulan sebagai berikut:

1. berdasarkan perhitungan gempa yang telah dilakukan oleh penulis, provinsi DI Yogyakarta memiliki Kategori Desain Seismik D dengan $S_s = 1,21g$, $S_I = 0,444 g$, dan dengan kelas situs tanah yaitu tanah sedang,
2. sistem struktur yang digunakan Sistem Ganda yang terdiri dari Sistem Rangka Pemikul Momen Khusus dan Dinding Struktur Beton Bertulang Khusus,
3. balok yang didesain Balok B1 dengan menggunakan SNI 2847:2013 sehingga menghasilkan penulangan bagian moment negatif tumpuan dipasang 5D19 dan bagian moment positif tumpuan dipasang 3 D19 dengan sengkang tumpuan 3P10-150 untuk penulangan bagian moment negatif tumpuan dipasang 3D19 dan bagian moment positif tumpuan dipasang 3D19 dengan sengkang 2P10-150,
4. kolom yang didesain merupakan Kolom lantai 5 dengan menggunakan SNI 2847:2013 sehingga menghasilkan 12D19 dengan tulangan transversal 3D13-100,

5. dinding geser beton bertulang yang didesain merupakan dinding geser beton bertulang lantai 1 dengan menggunakan SNI 2847:2013 sehingga menghasikan penulangan arah memanjang dan tegak lurus 2D19-400 dengan komponen batas khusus sepanjang 1100 mm dengan sengkang arah panjang 2D13-150 dan arah panjang 7D13-150

6.2 Saran

Setelah menyelesaikan tugas akhir ini, penulis memiliki beberapa saran yaitu sebagai berikut:

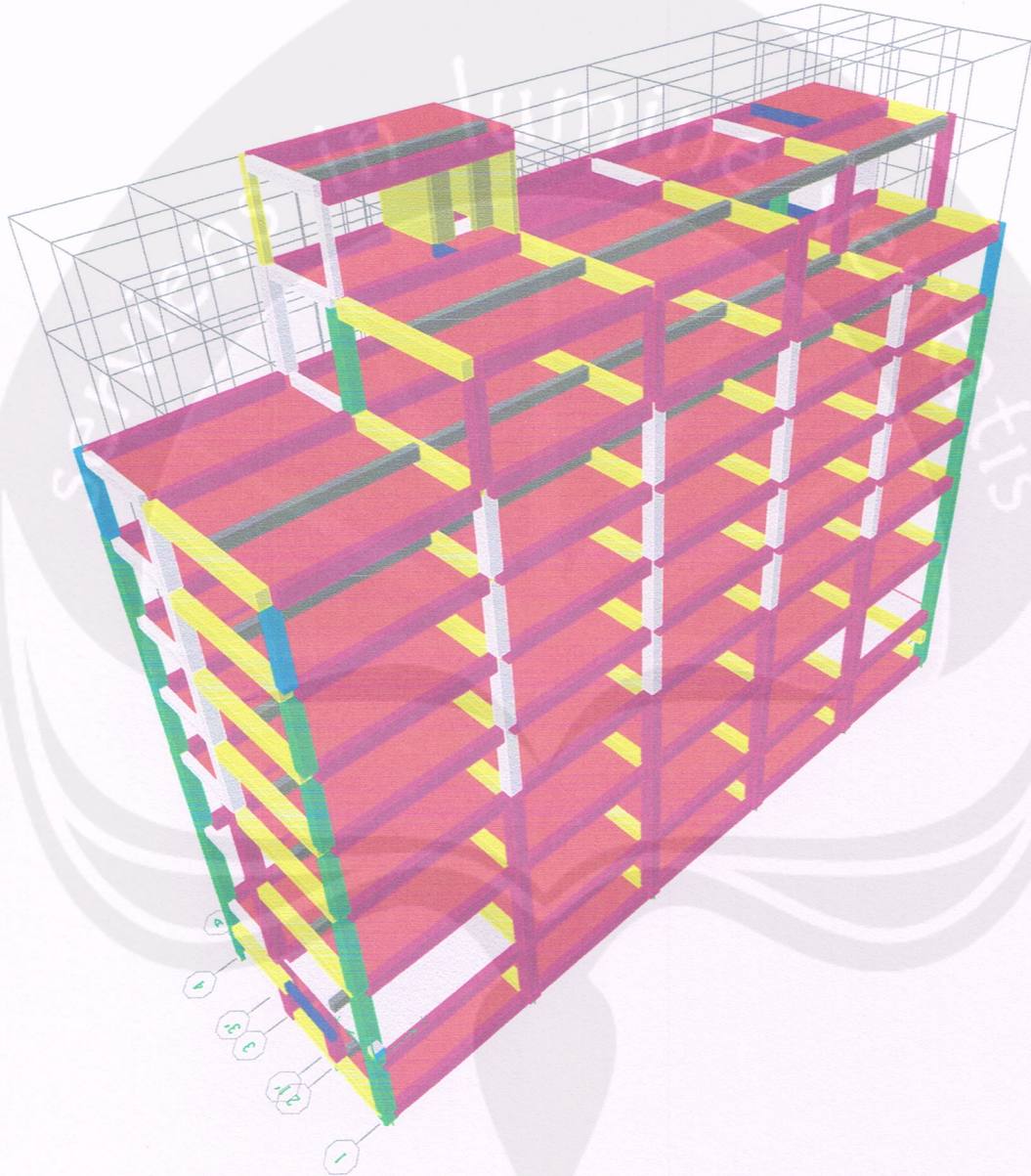
1. diperlukan perbandingan pembebanan antara SNI 1727:2013, PPURG 1987 dan material yang berasal dari data pasar sehingga mendapatkan nilai pembebanan yang akurat,
2. jika tidak ada batasan dalam perancangan struktur kolom, sebaiknya kolom dirancang sebagai kolom persegi sehingga mempermudah proses perancangan struktur kolom,
3. sebaiknya dilakukan peninjauan perencanaan penulangan pelat dengan menggunakan *wire mesh*,
4. dalam merancang struktur bangunan gedung, sebaiknya kita juga mempertimbangkan kesulitan-kesulitan yang mungkin terjadi dilapangan.

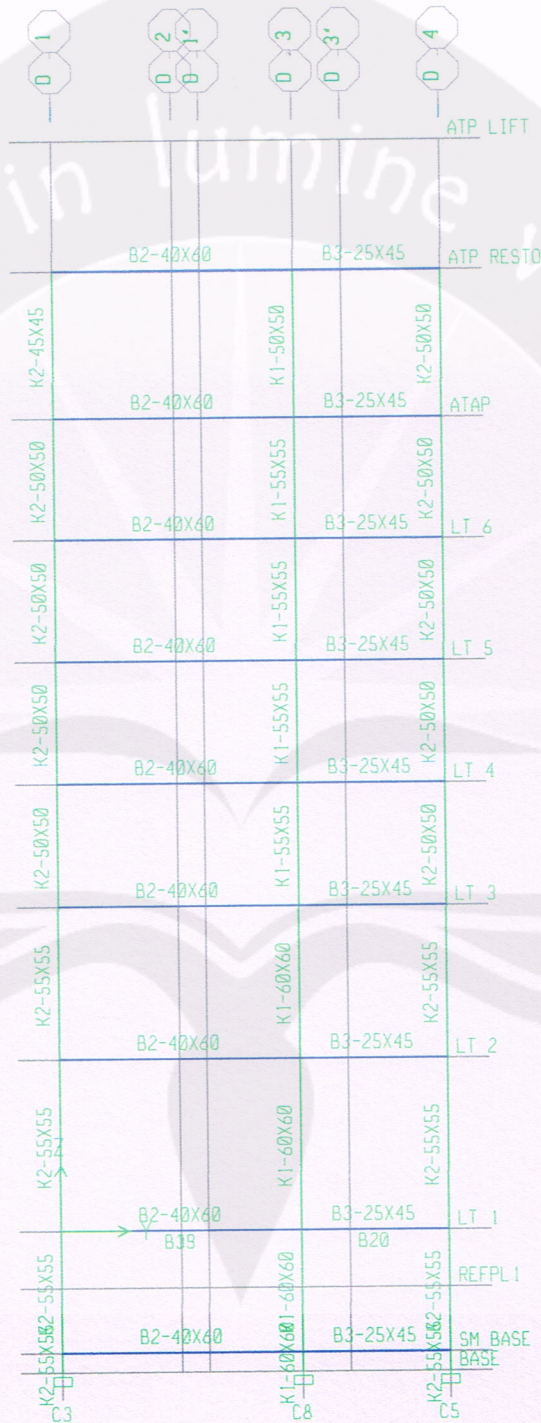
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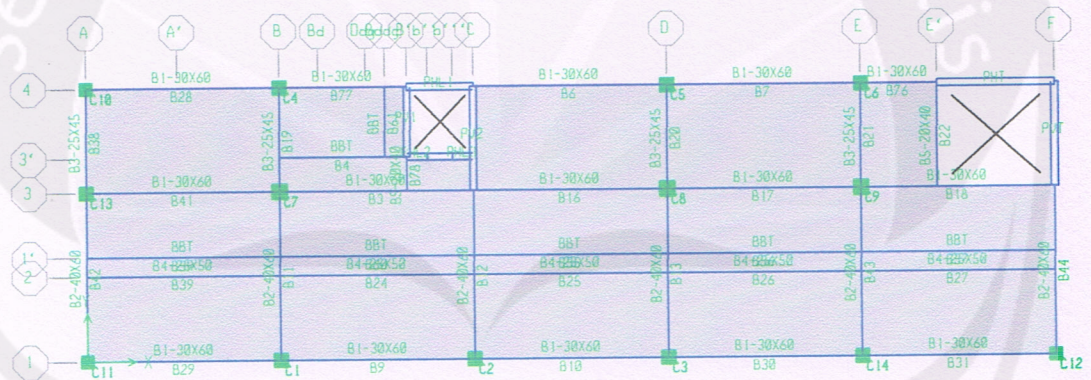


LAMPIRAN A





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LOADING COMBINATIONS

| COMBO | COMBO | CASE | CASE | SCALE |
|-------|--------|-------|-------|--------|
| COMBO | TYPE | CASE | TYPE | FACTOR |
| ENVE | ENVE | COMB1 | Combo | 1.0000 |
| | COMB2 | Combo | | 1.0000 |
| | COMB3 | Combo | | 1.0000 |
| | COMB4 | Combo | | 1.0000 |
| | COMB5 | Combo | | 1.0000 |
| | COMB6 | Combo | | 1.0000 |
| | COMB7 | Combo | | 1.0000 |
| | COMB8 | Combo | | 1.0000 |
| | COMB9 | Combo | | 1.0000 |
| | COMB10 | Combo | | 1.0000 |
| | COMB11 | Combo | | 1.0000 |
| | COMB12 | Combo | | 1.0000 |
| | COMB13 | Combo | | 1.0000 |
| | COMB14 | Combo | | 1.0000 |
| | COMB15 | Combo | | 1.0000 |
| | COMB16 | Combo | | 1.0000 |
| | COMB17 | Combo | | 1.0000 |
| | COMB18 | Combo | | 1.0000 |

BEAM FORCES

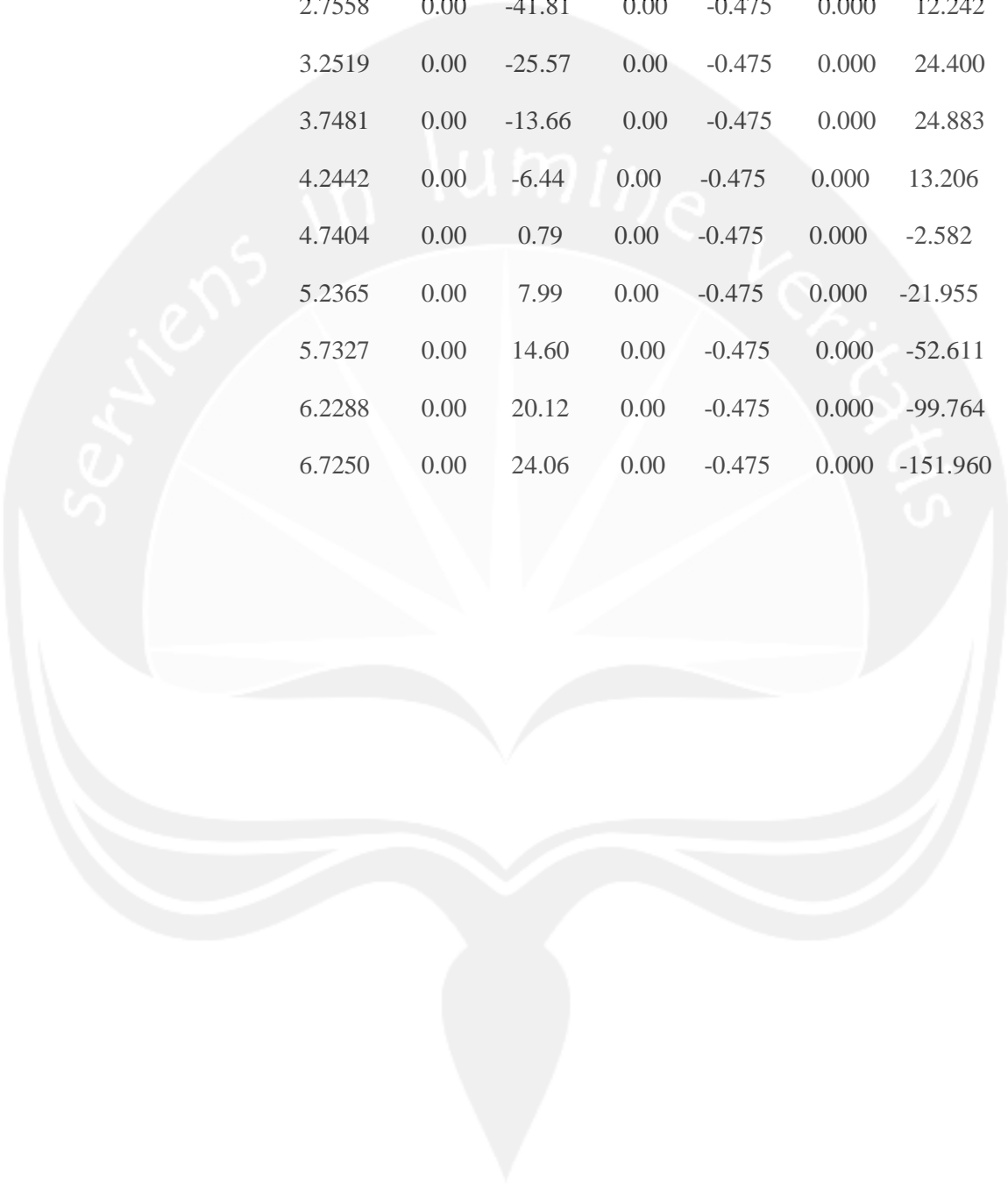
STORY BEAM LOAD LOC P V2 V3 T M2
 M3

LT 4 B17 ENVE MAX

| | | | | | | |
|--------|------|--------|------|-------|-------|--------|
| 0.2750 | 0.00 | -23.97 | 0.00 | 0.781 | 0.000 | 13.142 |
| 0.7712 | 0.00 | -20.03 | 0.00 | 0.781 | 0.000 | 24.125 |
| 1.2673 | 0.00 | -14.51 | 0.00 | 0.781 | 0.000 | 32.760 |
| 1.7635 | 0.00 | -7.90 | 0.00 | 0.781 | 0.000 | 47.502 |
| 2.2596 | 0.00 | -0.71 | 0.00 | 0.781 | 0.000 | 63.139 |
| 2.7558 | 0.00 | 6.52 | 0.00 | 0.781 | 0.000 | 70.724 |
| 3.2519 | 0.00 | 13.75 | 0.00 | 0.781 | 0.000 | 70.253 |
| 3.7481 | 0.00 | 25.30 | 0.00 | 0.781 | 0.000 | 69.815 |
| 4.2442 | 0.00 | 41.54 | 0.00 | 0.781 | 0.000 | 69.896 |
| 4.7404 | 0.00 | 57.78 | 0.00 | 0.781 | 0.000 | 62.445 |
| 5.2365 | 0.00 | 73.94 | 0.00 | 0.781 | 0.000 | 46.941 |
| 5.7327 | 0.00 | 88.68 | 0.00 | 0.781 | 0.000 | 31.537 |
| 6.2288 | 0.00 | 100.76 | 0.00 | 0.781 | 0.000 | 22.858 |
| 6.7250 | 0.00 | 109.00 | 0.00 | 0.781 | 0.000 | 11.832 |

LT 4 B17 ENVE MIN

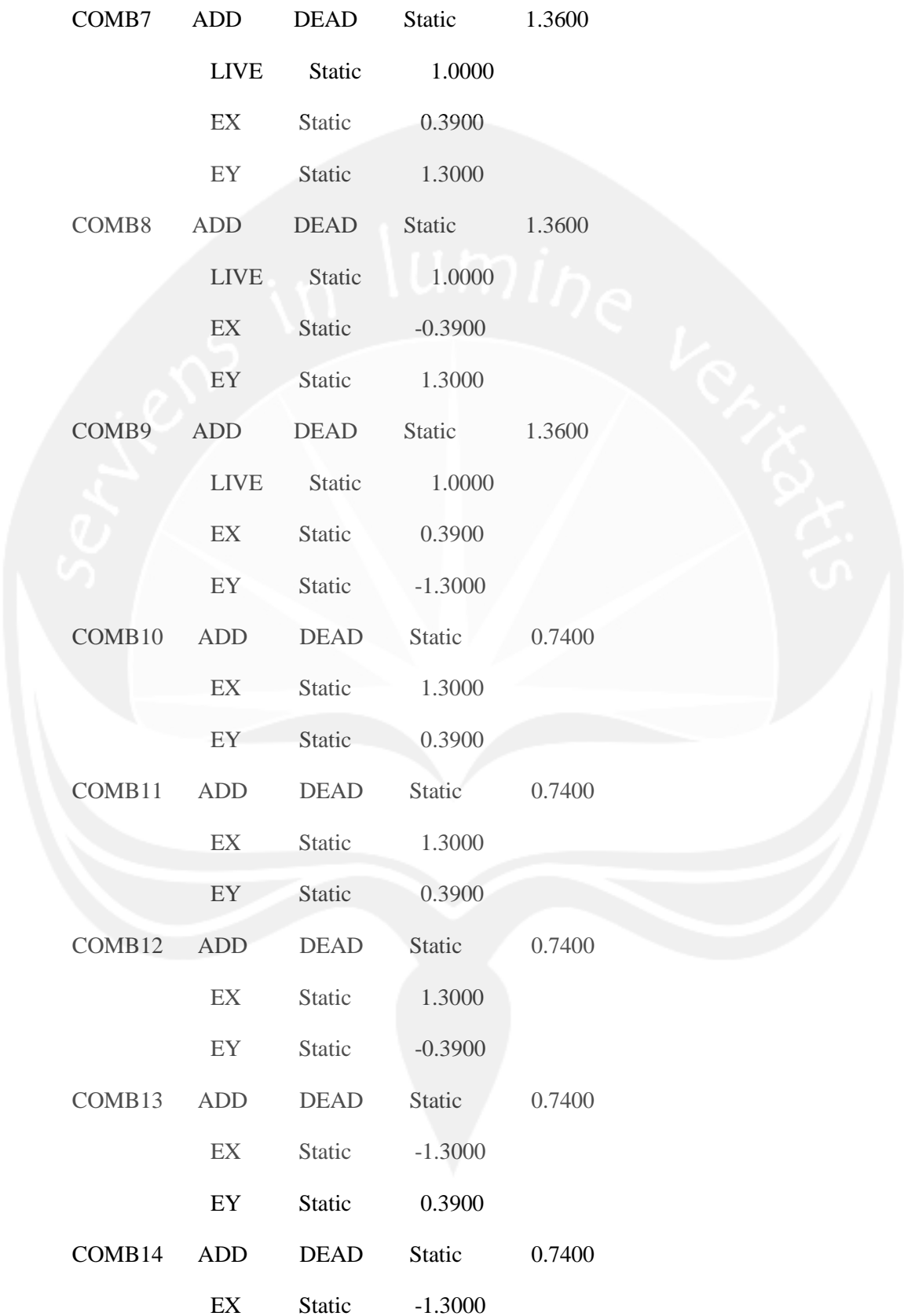
| | | | | | | |
|--------|------|---------|------|--------|-------|----------|
| 0.2750 | 0.00 | -109.27 | 0.00 | -0.475 | 0.000 | -153.858 |
| 0.7712 | 0.00 | -101.03 | 0.00 | -0.475 | 0.000 | -101.527 |
| 1.2673 | 0.00 | -88.95 | 0.00 | -0.475 | 0.000 | -54.241 |



| | | | | | | |
|--------|------|--------|------|--------|-------|----------|
| 1.7635 | 0.00 | -74.21 | 0.00 | -0.475 | 0.000 | -22.832 |
| 2.2596 | 0.00 | -58.05 | 0.00 | -0.475 | 0.000 | -3.503 |
| 2.7558 | 0.00 | -41.81 | 0.00 | -0.475 | 0.000 | 12.242 |
| 3.2519 | 0.00 | -25.57 | 0.00 | -0.475 | 0.000 | 24.400 |
| 3.7481 | 0.00 | -13.66 | 0.00 | -0.475 | 0.000 | 24.883 |
| 4.2442 | 0.00 | -6.44 | 0.00 | -0.475 | 0.000 | 13.206 |
| 4.7404 | 0.00 | 0.79 | 0.00 | -0.475 | 0.000 | -2.582 |
| 5.2365 | 0.00 | 7.99 | 0.00 | -0.475 | 0.000 | -21.955 |
| 5.7327 | 0.00 | 14.60 | 0.00 | -0.475 | 0.000 | -52.611 |
| 6.2288 | 0.00 | 20.12 | 0.00 | -0.475 | 0.000 | -99.764 |
| 6.7250 | 0.00 | 24.06 | 0.00 | -0.475 | 0.000 | -151.960 |

LOADING COMBINATIONS

| COMBO | COMBO TYPE | CASE | CASE TYPE | SCALE FACTOR |
|-------|------------|------|-----------|--------------|
| COMB1 | ADD | DEAD | Static | 1.4000 |
| COMB2 | ADD | DEAD | Static | 1.2000 |
| | | LIVE | Static | 1.6000 |
| COMB3 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | 1.3000 |
| | | EY | Static | 0.3900 |
| COMB4 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | 1.3000 |
| | | EY | Static | -0.3900 |
| COMB5 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | -1.3000 |
| | | EY | Static | 0.3900 |
| COMB6 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | -1.3000 |
| | | EY | Static | -0.3900 |



| | | | | |
|--------|------|--------|---------|--------|
| COMB7 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | 0.3900 | |
| | EY | Static | 1.3000 | |
| COMB8 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | -0.3900 | |
| | EY | Static | 1.3000 | |
| COMB9 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | 0.3900 | |
| | EY | Static | -1.3000 | |
| COMB10 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | 0.3900 | |
| COMB11 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | 0.3900 | |
| COMB12 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | -0.3900 | |
| COMB13 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -1.3000 | |
| | EY | Static | 0.3900 | |
| COMB14 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -1.3000 | |

| | | | | |
|--------|-----|--------|---------|--------|
| | EY | Static | -0.3900 | |
| COMB15 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 0.3900 | |
| | EY | Static | 1.3000 | |
| COMB16 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -0.3900 | |
| | EY | Static | 1.3000 | |
| COMB17 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 0.3900 | |
| | EY | Static | -1.3000 | |
| COMB18 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -0.3900 | |
| | EY | Static | -1.3000 | |

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COLUMN FORCES

| STORY | COLUMN | LOAD | LOC | P | V2 | V3 | T |
|--------|--------|--------|----------|--------|-------|--------|----------|
| M2 | M3 | | | | | | |
| LT 6 | C8 | COMB1 | | | | | |
| | | 0.0000 | -1195.72 | -15.06 | 22.40 | -0.064 | 34.119 - |
| 25.988 | | | | | | | |
| | | 1.3000 | -1182.75 | -15.06 | 22.40 | -0.064 | 4.992 - |
| 6.404 | | | | | | | |

13.179 2.6000 -1169.78 -15.06 22.40 -0.064 -24.134

LT 6 C8 COMB2
36.108 0.0000 -1476.49 -21.06 21.04 0.014 33.606 -

8.733 1.3000 -1465.37 -21.06 21.04 0.014 6.252 -

18.641 2.6000 -1454.25 -21.06 21.04 0.014 -21.103

LT 6 C8 COMB3
32.382 0.0000 -1457.77 22.35 43.49 1.893 68.448

3.322 1.3000 -1445.17 22.35 43.49 1.893 11.908

25.737 2.6000 -1432.57 22.35 43.49 1.893 -44.631 -

LT 6 C8 COMB4
34.145 0.0000 -1463.45 23.31 17.14 2.930 26.168

3.837 1.3000 -1450.84 23.31 17.14 2.930 3.885

26.472 2.6000 -1438.24 23.31 17.14 2.930 -18.397 -

LT 6 C8 COMB5
101.927 0.0000 -1424.16 -62.76 28.69 -2.967 45.572 -

20.334 1.3000 -1411.55 -62.76 28.69 -2.967 8.280 -

61.258 2.6000 -1398.95 -62.76 28.69 -2.967 -29.012

LT 6 C8 COMB6
100.163 0.0000 -1429.83 -61.80 2.33 -1.930 3.291 -

19.820 1.3000 -1417.23 -61.80 2.33 -1.930 0.257 -

60.524 2.6000 -1404.63 -61.80 2.33 -1.930 -2.778

LT 6 C8 COMB7
16.684 0.0000 -1439.38 -8.56 69.05 -1.018 109.769 -

5.558 1.3000 -1426.78 -8.56 69.05 -1.018 19.999 -

5.568 2.6000 -1414.18 -8.56 69.05 -1.018 -69.771

LT 6 C8 COMB8
56.976 0.0000 -1429.30 -34.09 64.61 -2.476 102.906 -

12.655 1.3000 -1416.70 -34.09 64.61 -2.476 18.911 -

31.667 2.6000 -1404.09 -34.09 64.61 -2.476 -65.085

LT 6 C8 COMB9

10.805 0.0000 -1458.31 -5.36 -18.79 2.439 -31.167 -

3.843 1.3000 -1445.70 -5.36 -18.79 2.439 -6.745 -

3.119 2.6000 -1433.10 -5.36 -18.79 2.439 17.676

LT 6 C8 COMB10

52.536 0.0000 -645.99 34.12 32.42 1.878 50.613

 1.3000 -639.14 34.12 32.42 1.878 8.465 8.186

36.164 2.6000 -632.28 34.12 32.42 1.878 -33.683 -

LT 6 C8 COMB11

52.536 0.0000 -645.99 34.12 32.42 1.878 50.613

 1.3000 -639.14 34.12 32.42 1.878 8.465 8.186

36.164 2.6000 -632.28 34.12 32.42 1.878 -33.683 -

LT 6 C8 COMB12

 0.0000 -651.67 35.08 6.07 2.915 8.332 54.299

 1.3000 -644.81 35.08 6.07 2.915 0.441 8.700

 2.6000 -637.96 35.08 6.07 2.915 -7.449 -36.899

LT 6 C8 COMB13

81.773 0.0000 -612.38 -51.00 17.62 -2.982 27.736 -

15.471 1.3000 -605.52 -51.00 17.62 -2.982 4.836 -

50.831 2.6000 -598.67 -51.00 17.62 -2.982 -18.064

LT 6 C8 COMB14
80.009 0.0000 -618.06 -50.04 -8.74 -1.945 -14.544 -

14.956 1.3000 -611.20 -50.04 -8.74 -1.945 -3.187 -

50.097 2.6000 -604.34 -50.04 -8.74 -1.945 8.170

LT 6 C8 COMB15
 0.0000 -627.60 3.20 57.98 -1.033 91.934 3.471
 1.3000 -620.75 3.20 57.98 -1.033 16.555 -0.694
4.859 2.6000 -613.89 3.20 57.98 -1.033 -58.823 -

LT 6 C8 COMB16
36.822 0.0000 -617.52 -22.33 53.54 -2.491 85.071 -

7.791 1.3000 -610.66 -22.33 53.54 -2.491 15.467 -

21.240 2.6000 -603.81 -22.33 53.54 -2.491 -54.137

LT 6 C8 COMB17
 0.0000 -646.53 6.41 -29.86 2.424 -49.002 9.349
 1.3000 -639.67 6.41 -29.86 2.424 -10.189 1.021

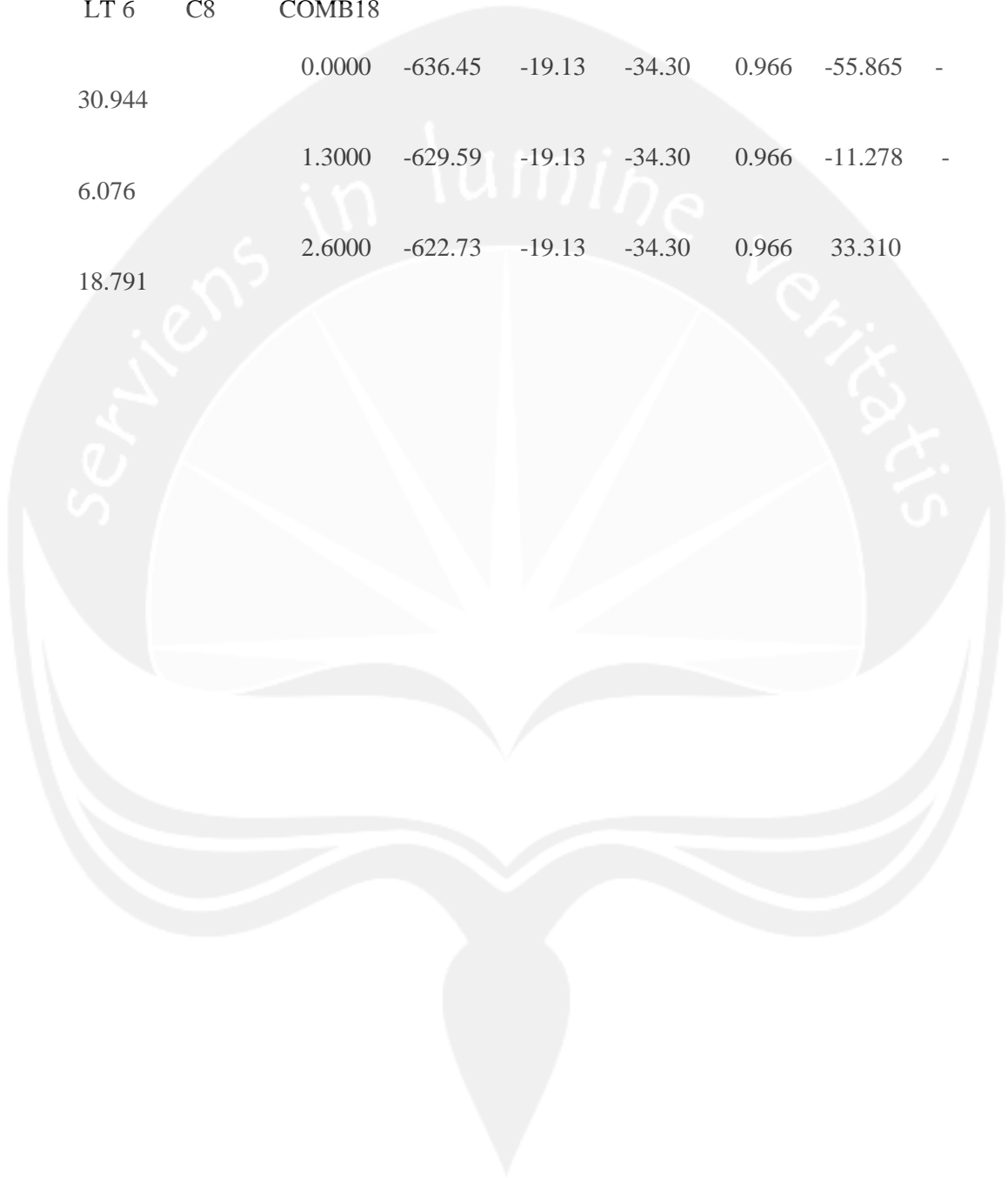
2.6000 -632.82 6.41 -29.86 2.424 28.624 -7.308

LT 6 C8 COMB18

0.0000 -636.45 -19.13 -34.30 0.966 -55.865 -
30.944

1.3000 -629.59 -19.13 -34.30 0.966 -11.278 -
6.076

2.6000 -622.73 -19.13 -34.30 0.966 33.310
18.791



LOADING COMBINATIONS

| COMBO | COMBO TYPE | CASE | CASE TYPE | SCALE FACTOR |
|-------|------------|------|-----------|--------------|
| COMB1 | ADD | DEAD | Static | 1.4000 |
| COMB2 | ADD | DEAD | Static | 1.2000 |
| | | LIVE | Static | 1.6000 |
| COMB3 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | 1.3000 |
| | | EY | Static | 0.3900 |
| COMB4 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | 1.3000 |
| | | EY | Static | -0.3900 |
| COMB5 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | -1.3000 |
| | | EY | Static | 0.3900 |
| COMB6 | ADD | DEAD | Static | 1.3600 |
| | | LIVE | Static | 1.0000 |
| | | EX | Static | -1.3000 |
| | | EY | Static | -0.3900 |

| | | | | |
|--------|------|--------|---------|--------|
| COMB7 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | 0.3900 | |
| | EY | Static | 1.3000 | |
| COMB8 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | -0.3900 | |
| | EY | Static | 1.3000 | |
| COMB9 | ADD | DEAD | Static | 1.3600 |
| | LIVE | Static | 1.0000 | |
| | EX | Static | 0.3900 | |
| | EY | Static | -1.3000 | |
| COMB10 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | 0.3900 | |
| COMB11 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | 0.3900 | |
| COMB12 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 1.3000 | |
| | EY | Static | -0.3900 | |
| COMB13 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -1.3000 | |
| | EY | Static | 0.3900 | |
| COMB14 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -1.3000 | |

| | | | | |
|--------|-----|--------|---------|--------|
| | EY | Static | -0.3900 | |
| COMB15 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 0.3900 | |
| | EY | Static | 1.3000 | |
| COMB16 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -0.3900 | |
| | EY | Static | 1.3000 | |
| COMB17 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | 0.3900 | |
| | EY | Static | -1.3000 | |
| COMB18 | ADD | DEAD | Static | 0.7400 |
| | EX | Static | -0.3900 | |
| | EY | Static | -1.3000 | |

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PIER FORCES

| STORY | PIER | LOAD LOC | P | V2 | V3 | T | M2 | M3 |
|---------|------|----------|----------|-------|------|----------|--------|----|
| LT 1 | PHT | COMB1 | | | | | | |
| 452.967 | | Top | -1296.16 | 73.82 | 1.59 | -102.614 | -2.535 | - |
| 216.731 | | Bottom | -1408.31 | 73.82 | 1.59 | -102.614 | 2.552 | - |

| | | | | | | | | |
|---------|-----|--------|----------|--------|------|----------|--------|---|
| LT 1 | PHT | COMB2 | | | | | | |
| 683.306 | | Top | -1323.78 | 115.44 | 2.99 | -213.832 | -3.521 | - |
| 313.905 | | Bottom | -1419.91 | 115.44 | 2.99 | -213.832 | 6.054 | - |

| | | | | | | | | |
|----------|-----|--------|----------|--------|------|----------|--------|--|
| LT 1 | PHT | COMB3 | | | | | | |
| 3057.452 | | Top | -1454.82 | 836.68 | 3.19 | -182.066 | 0.583 | |
| 5734.822 | | Bottom | -1563.77 | 836.68 | 3.19 | -182.066 | 10.776 | |

| | | | | | | | | |
|----------|-----|--------|---------|--------|------|----------|--------|--|
| LT 1 | PHT | COMB4 | | | | | | |
| 2276.564 | | Top | -283.31 | 853.74 | 2.51 | -183.404 | -1.313 | |
| 5008.522 | | Bottom | -392.26 | 853.74 | 2.51 | -183.404 | 6.708 | |

| | | | | | | | | |
|----------|-----|--------|----------|---------|------|----------|--------|---|
| LT 1 | PHT | COMB5 | | | | | | |
| 3525.425 | | Top | -2500.93 | -645.11 | 2.62 | -173.306 | -5.297 | - |
| 5589.769 | | Bottom | -2609.88 | -645.11 | 2.62 | -173.306 | 3.083 | - |

| | | | | | | | | |
|----------|-----|--------|----------|---------|------|----------|--------|---|
| LT 1 | PHT | COMB6 | | | | | | |
| 4306.313 | | Top | -1329.42 | -628.05 | 1.94 | -174.644 | -7.194 | - |
| 6316.069 | | Bottom | -1438.37 | -628.05 | 1.94 | -174.644 | -0.985 | - |

LT 1 PHT COMB7
Top -3187.72 298.15 3.78 -177.439 0.738
1664.481
Bottom -3296.67 298.15 3.78 -177.439 12.830
2618.566

LT 1 PHT COMB8
Top -3501.55 -146.38 3.61 -174.811 -1.026 -
310.382
Bottom -3610.50 -146.38 3.61 -174.811 10.522 -
778.812

LT 1 PHT COMB9
Top 717.31 355.01 1.52 -181.899 -5.584 -
938.479
Bottom 608.36 355.01 1.52 -181.899 -0.731
197.565

LT 1 PHT COMB10
Top -747.81 771.38 1.46 -57.950 2.549
3442.457
Bottom -807.09 771.38 1.46 -57.950 7.229
5910.887

LT 1 PHT COMB11
Top -747.81 771.38 1.46 -57.950 2.549
3442.457
Bottom -807.09 771.38 1.46 -57.950 7.229
5910.887

| | | | | | | | |
|----------|-----|--------|--------|--------|------|---------|-------|
| LT 1 | PHT | COMB12 | | | | | |
| | | Top | 423.70 | 788.44 | 0.78 | -59.288 | 0.652 |
| 2661.569 | | | | | | | |
| | | Bottom | 364.42 | 788.44 | 0.78 | -59.288 | 3.161 |
| 5184.587 | | | | | | | |

| | | | | | | | |
|----------|-----|--------|----------|---------|------|---------|----------|
| LT 1 | PHT | COMB13 | | | | | |
| | | Top | -1793.93 | -710.40 | 0.90 | -49.190 | -3.332 - |
| 3140.420 | | | | | | | |
| | | Bottom | -1853.21 | -710.40 | 0.90 | -49.190 | -0.463 - |
| 5413.703 | | | | | | | |

| | | | | | | | |
|----------|-----|--------|---------|---------|------|---------|----------|
| LT 1 | PHT | COMB14 | | | | | |
| | | Top | -622.42 | -693.34 | 0.22 | -50.528 | -5.229 - |
| 3921.308 | | | | | | | |
| | | Bottom | -681.70 | -693.34 | 0.22 | -50.528 | -4.532 - |
| 6140.004 | | | | | | | |

| | | | | | | | |
|----------|-----|--------|----------|--------|------|---------|-------|
| LT 1 | PHT | COMB15 | | | | | |
| | | Top | -2480.71 | 232.86 | 2.06 | -53.323 | 2.703 |
| 2049.486 | | | | | | | |
| | | Bottom | -2539.99 | 232.86 | 2.06 | -53.323 | 9.284 |
| 2794.631 | | | | | | | |

| | | | | | | | |
|---------|-----|--------|----------|---------|------|---------|---------|
| LT 1 | PHT | COMB16 | | | | | |
| | | Top | -2794.55 | -211.68 | 1.89 | -50.695 | 0.939 |
| 74.623 | | | | | | | |
| | | Bottom | -2853.83 | -211.68 | 1.89 | -50.695 | 6.976 - |
| 602.746 | | | | | | | |

LT 1 PHT COMB17

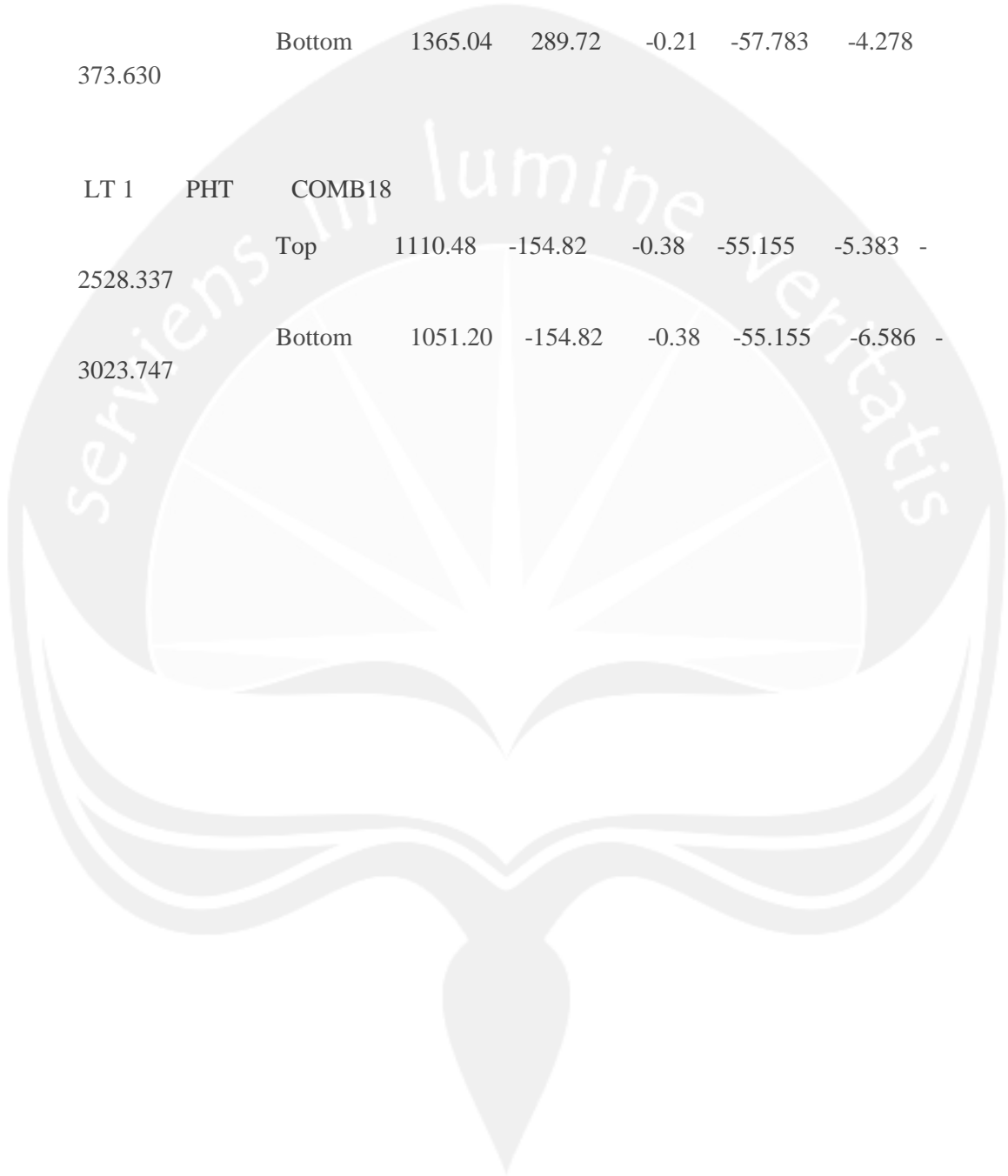
553.474 Top 1424.32 289.72 -0.21 -57.783 -3.619 -

373.630 Bottom 1365.04 289.72 -0.21 -57.783 -4.278

LT 1 PHT COMB18

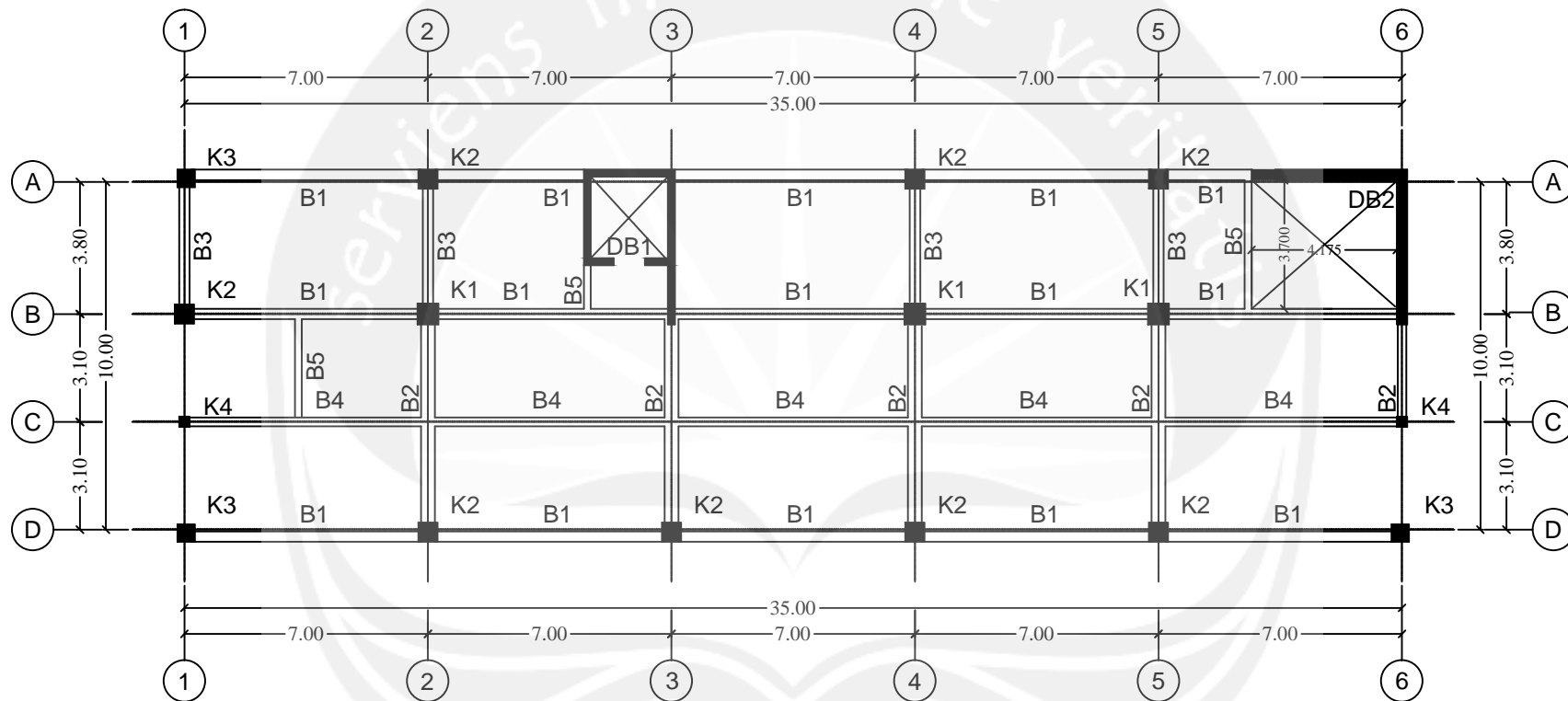
2528.337 Top 1110.48 -154.82 -0.38 -55.155 -5.383 -

3023.747 Bottom 1051.20 -154.82 -0.38 -55.155 -6.586 -

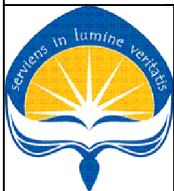




LAMPIRAN B




Denah Balok dan Kolom Lantai 1
 Skala 1 : 200



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BONI SITANGGANG
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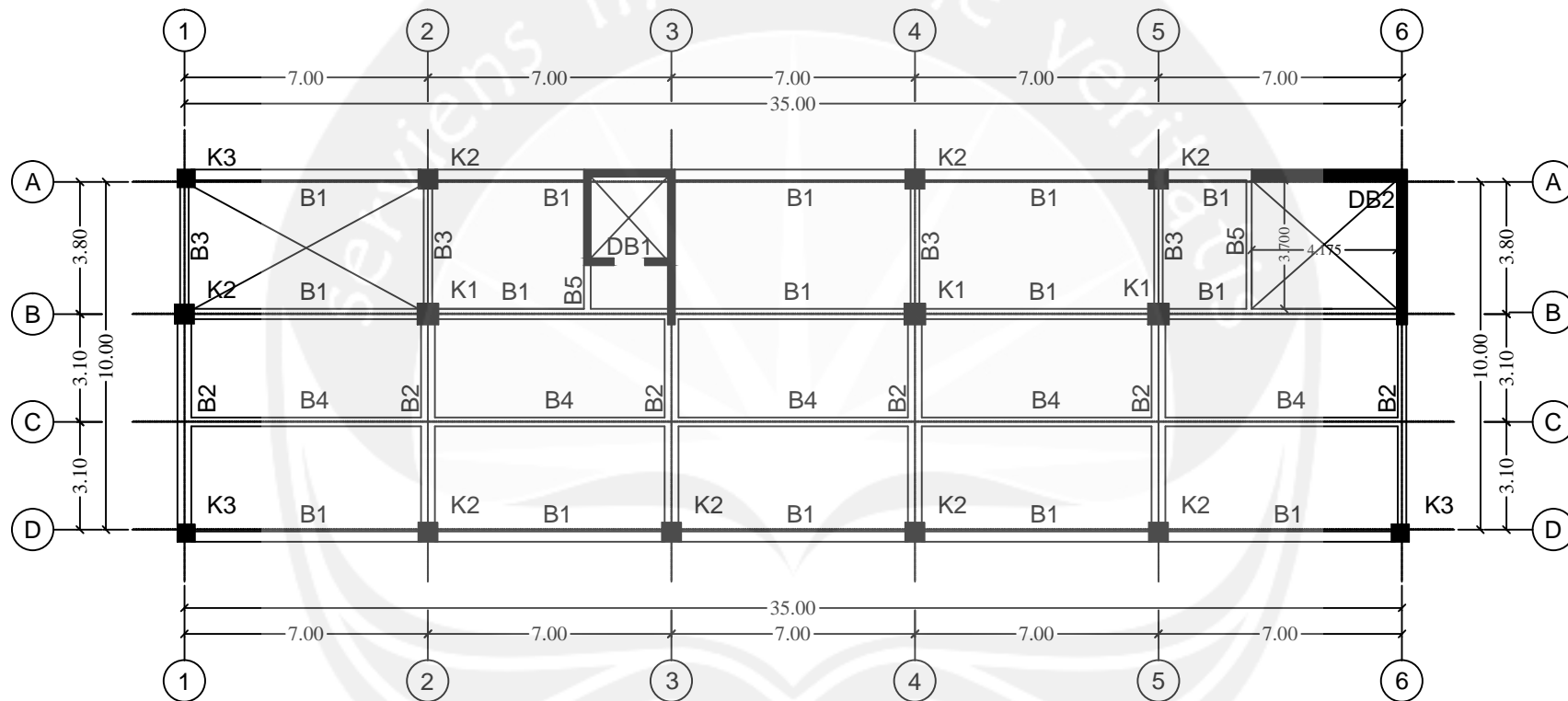
JUDUL GAMBAR

DENAH BALOK dan
 KOLOM LANTAI 1

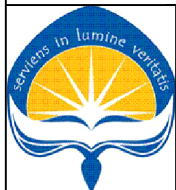
PARAF

SKALA

1 : 200




Denah Balok dan Kolom Lantai 2
 Skala 1 : 200



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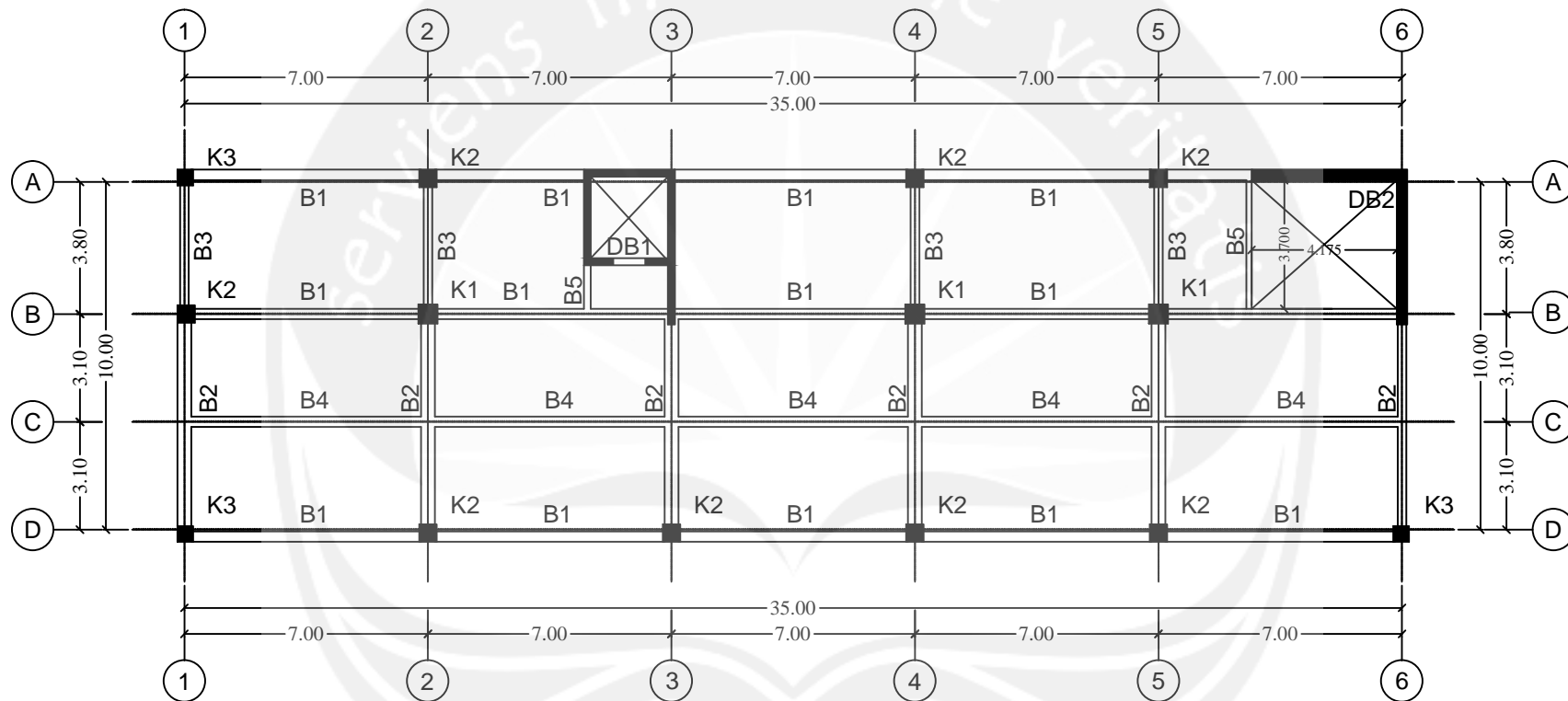
JUDUL GAMBAR

DENAH BALOK dan
 KOLOM LANTAI 2

PARAF

SKALA

1 : 200




Denah Balok dan Kolom Lantai 3-6
 Skala 1 : 200



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BONI SITANGGANG
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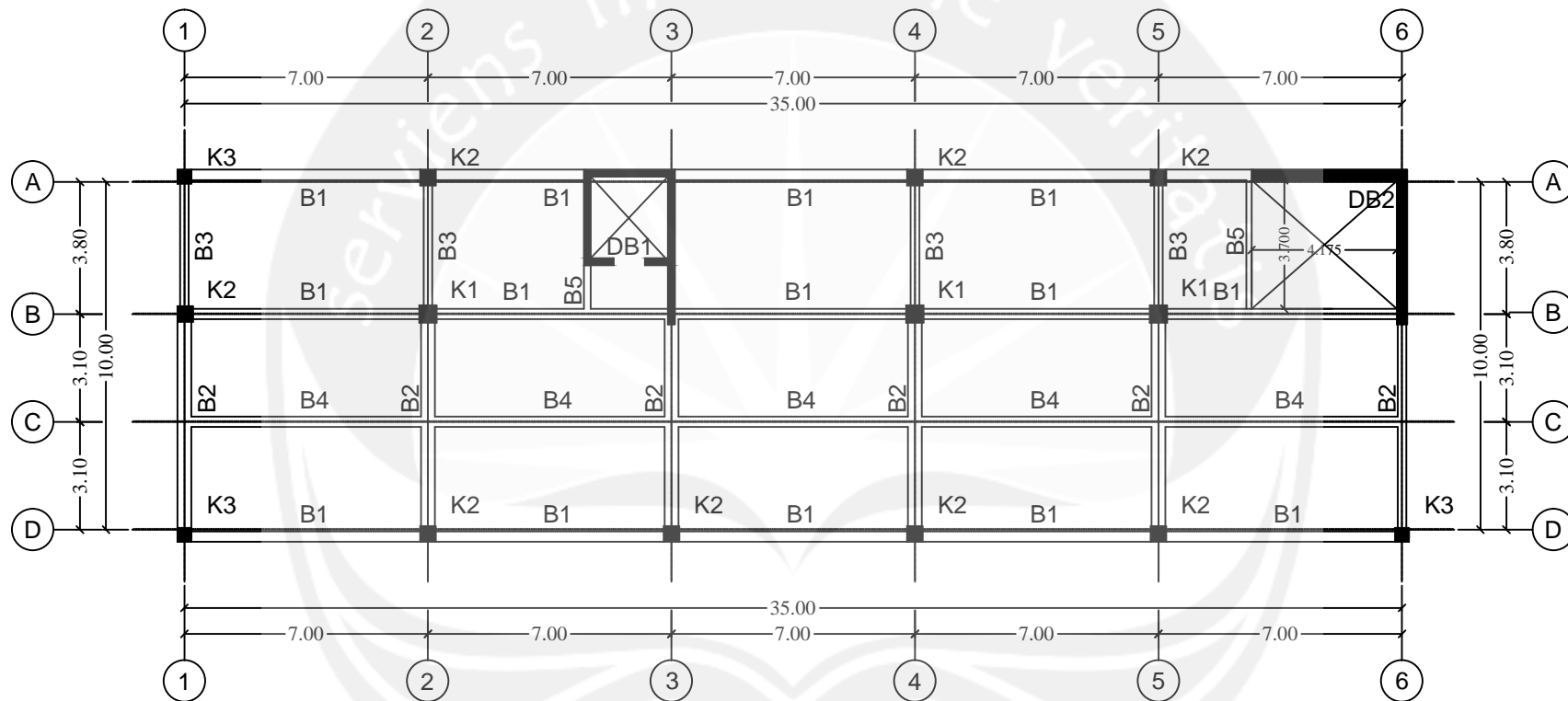
JUDUL GAMBAR

DENAH BALOK dan
 KOLOM LANTAI 3 - 6

PARAF

SKALA

1 : 200




Denah Balok dan Kolom Lantai Atap
 Skala 1 : 200



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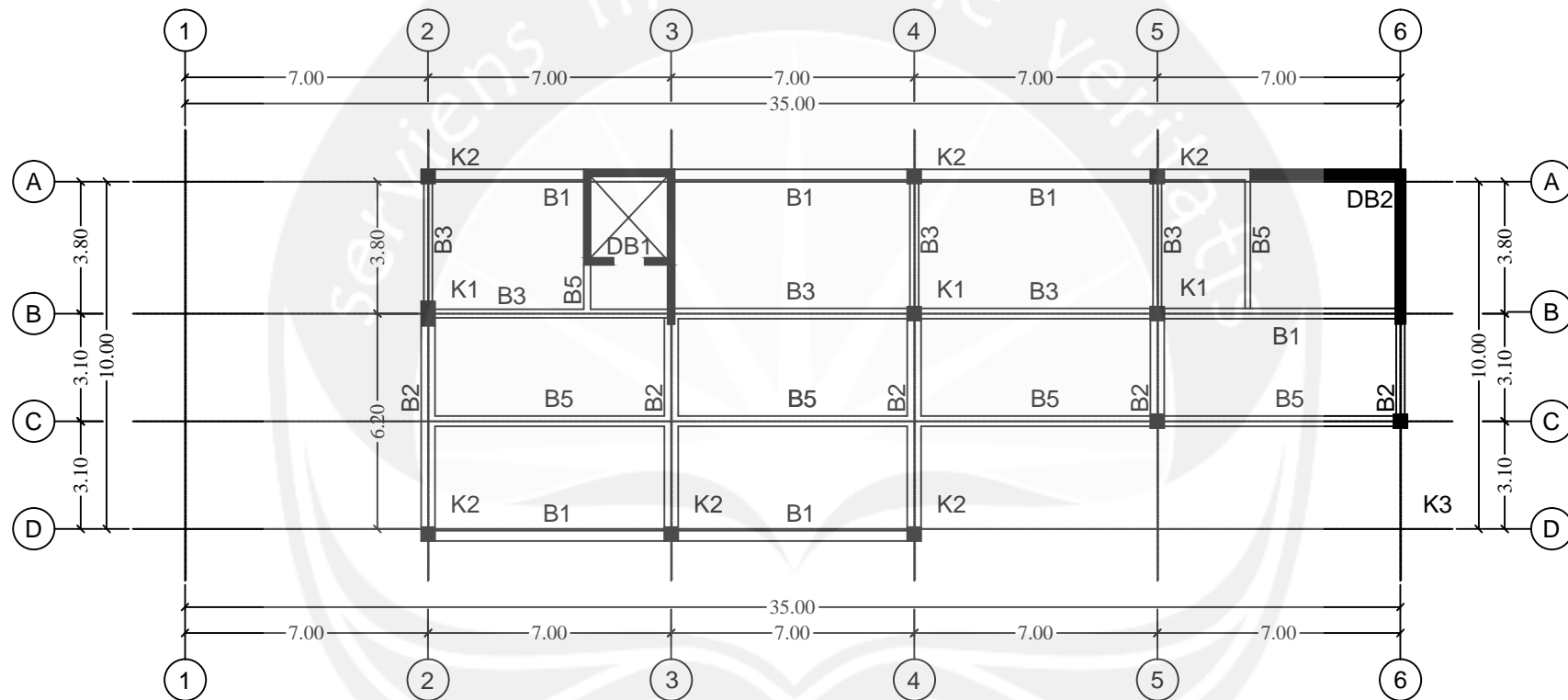
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DENAH BALOK dan
 KOLOM LANTAI ATAP

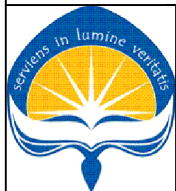
PARAF

SKALA

1 : 200




Denah Balok dan Kolom Lantai Atap Resto
 Skala 1 : 200



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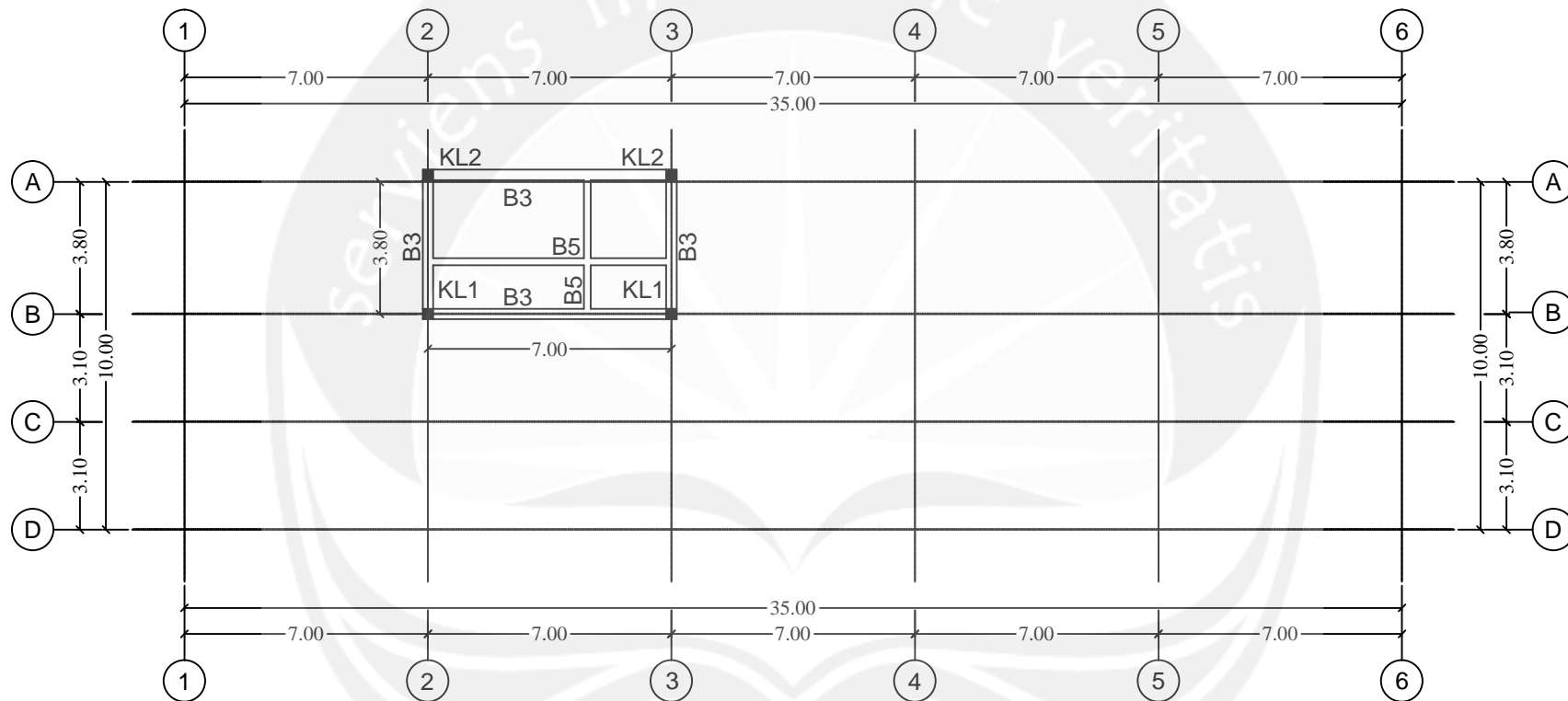
PENULIS
 BONI SITANGGANG
 11 02 13932

JUDUL GAMBAR
 DENAH BALOK dan
 KOLOM ATAP RESTO

PARAF

SKALA

1 : 200




Denah Balok dan Kolom Lantai Atap Lift
 Skala 1 : 200



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BONI SITANGGANG
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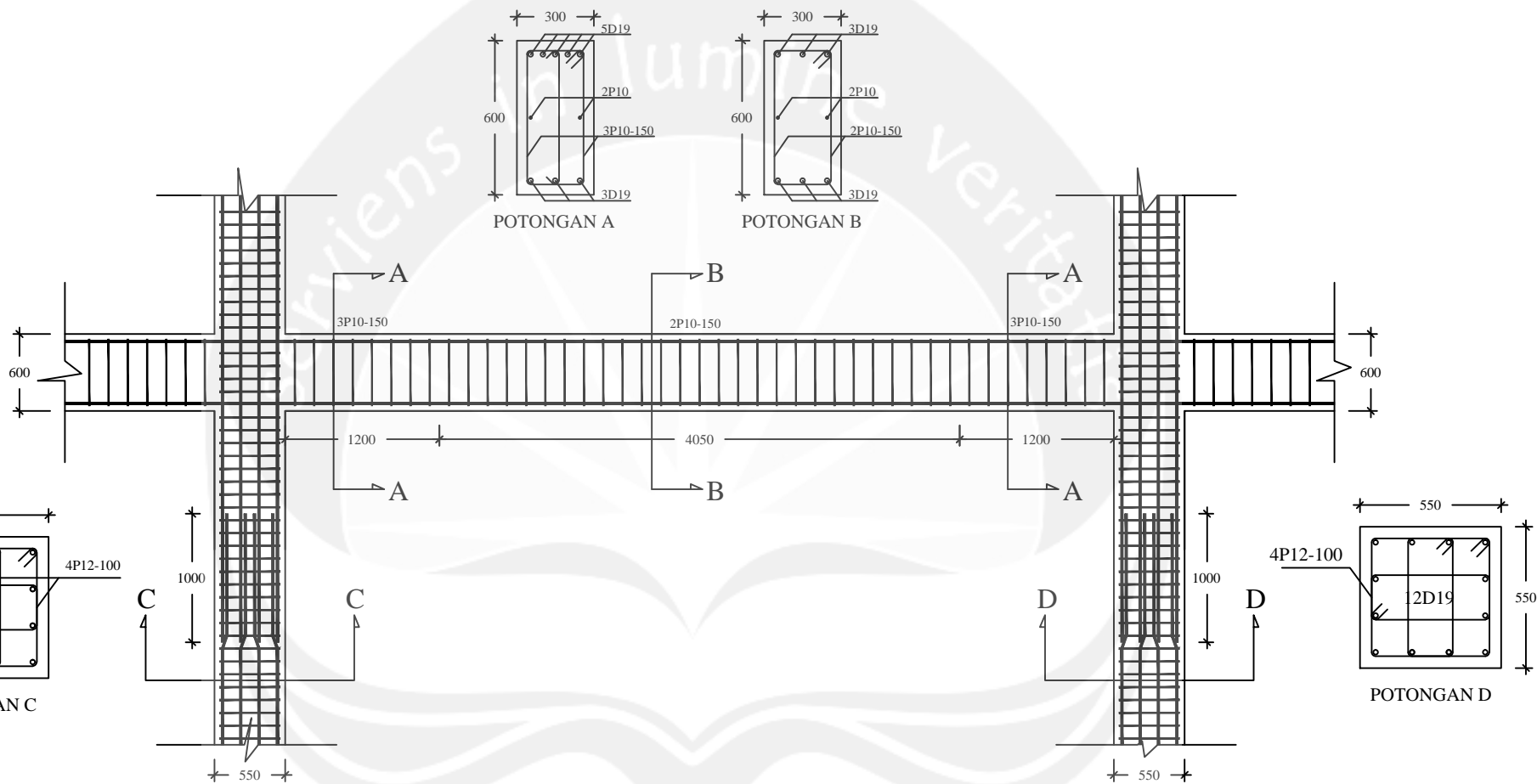
JUDUL GAMBAR

DENAH BALOK dan
 KOLOM ATAP LIFT

PARAF

SKALA

1 : 200



⊕ DETAIL PENULANGAN BALOK dan KOLOM
Skala 1 : 75



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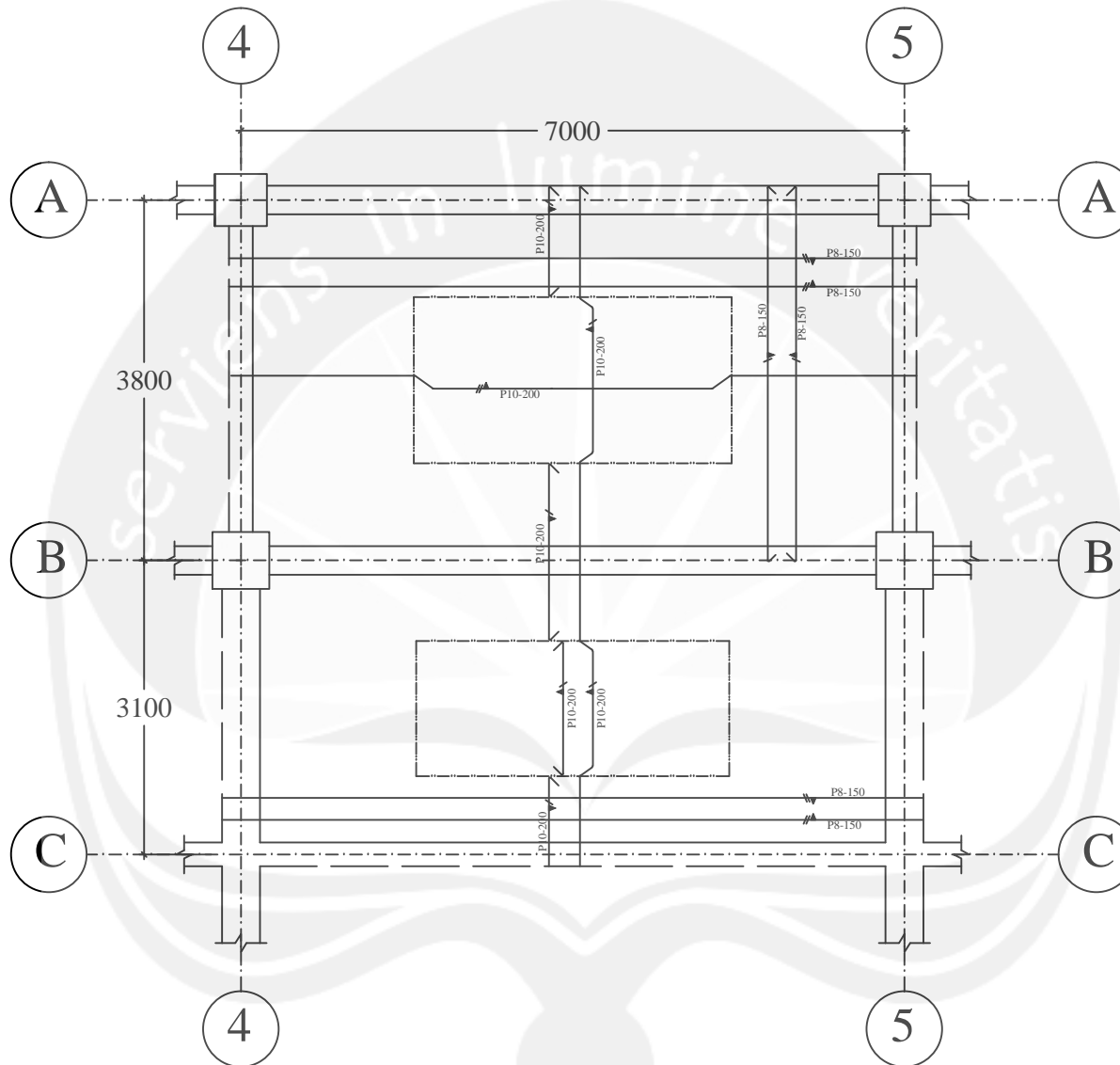
PENULIS
BONI SITANGGANG
11 02 13932

JUDUL GAMBAR
DETAIL PENULANGAN
BALOK dan KOLOM

PARAF

SKALA

1 : 50
1 : 25



⊕ DETAIL PENULANGAN PELAT LANTAI 1
Skala 1 : 75



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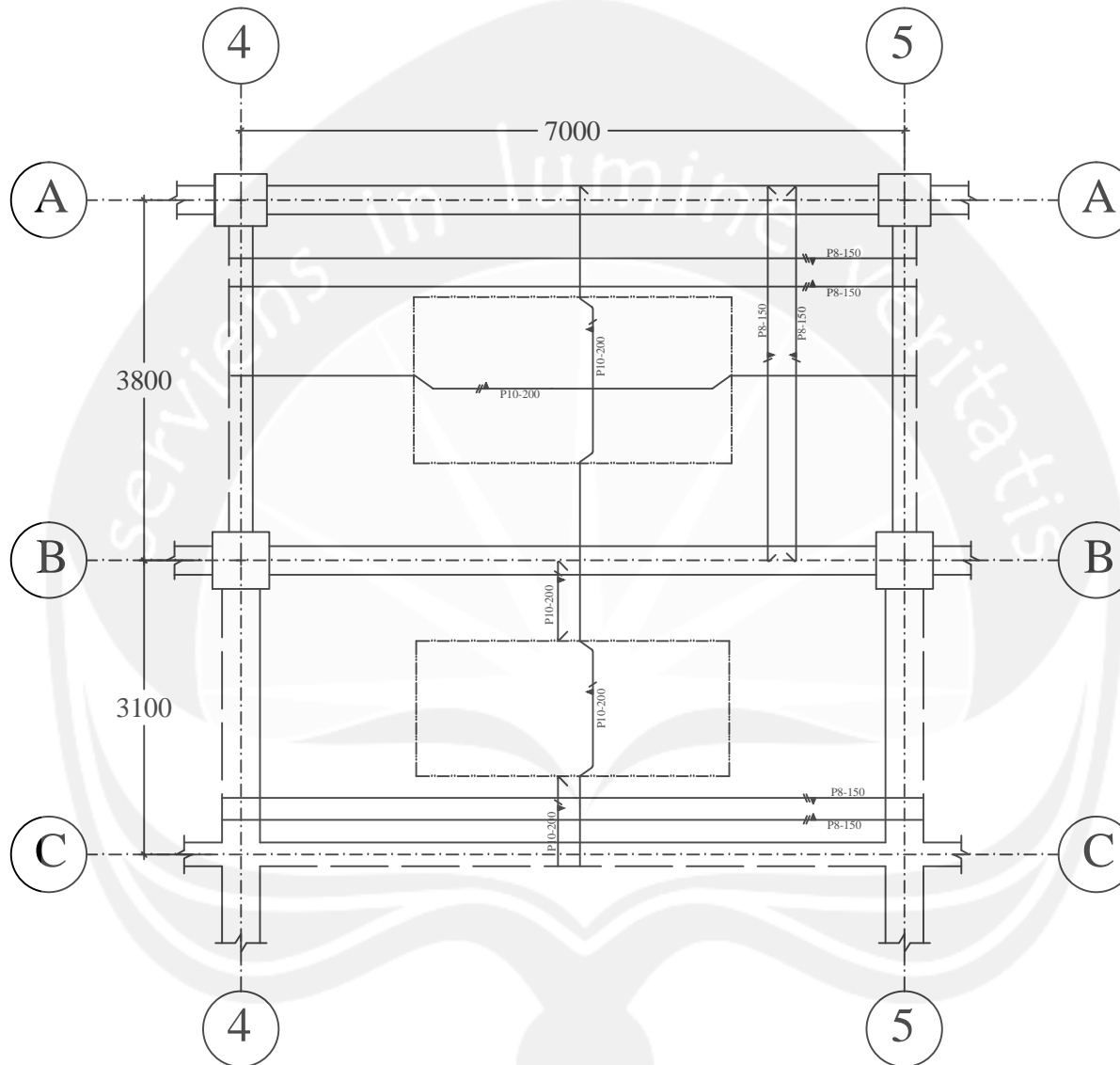
JUDUL GAMBAR

PELAT LANTAI 1

PARAF

SKALA

1 : 75



DETAIL PENULANGAN PELAT LANTAI GEDUNG
Skala 1 : 75



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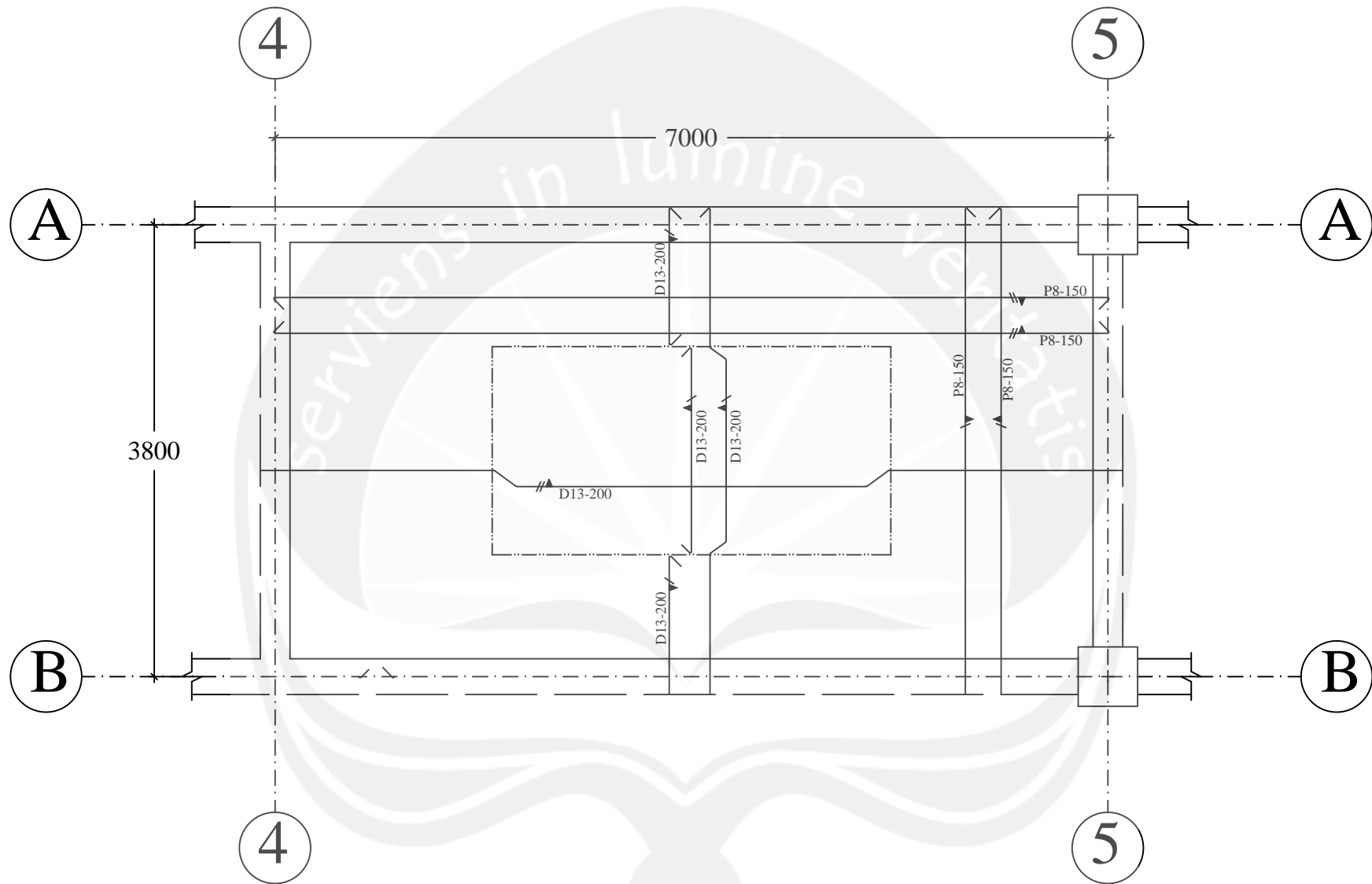
JUDUL GAMBAR

PENULANGAN PELAT
LANTAI GEDUNG

PARAF

SKALA

1 : 75



⊕ DETAIL PENULANGAN PELAT LANTAI TANDON
Skala 1 : 75



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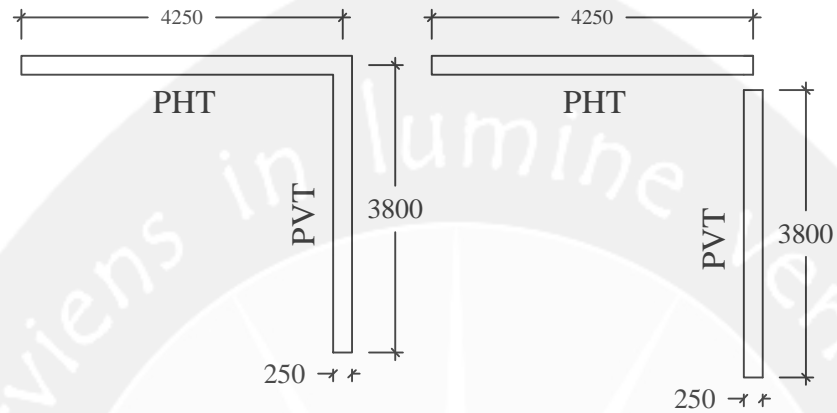
PENULIS
BONI SITANGGANG
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JUDUL GAMBAR
DETAIL PENULANGAN
LANTAI TANDON

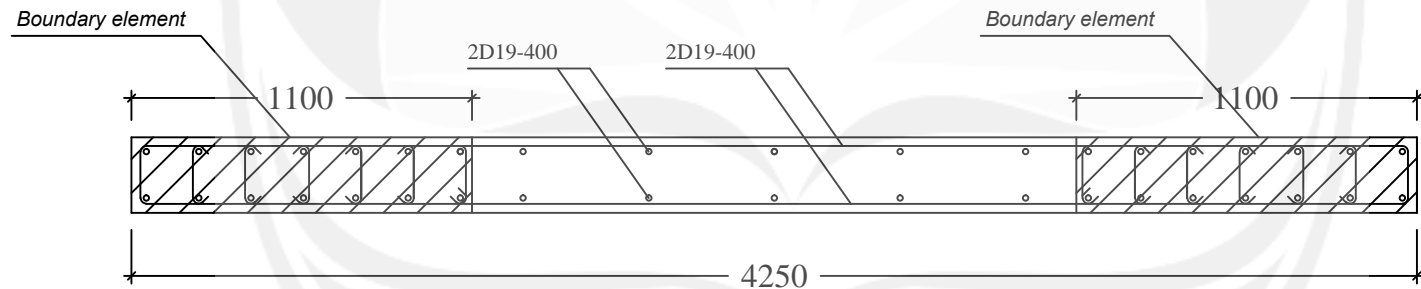
PARAF

SKALA

1 : 50



SECTION DESIGN
Skala 1 : 50



PENULANGAN DINDING GESER
Skala 1 : 25

DETAIL PENULANGAN DINDING STRUKTUR
Skala 1 : 25



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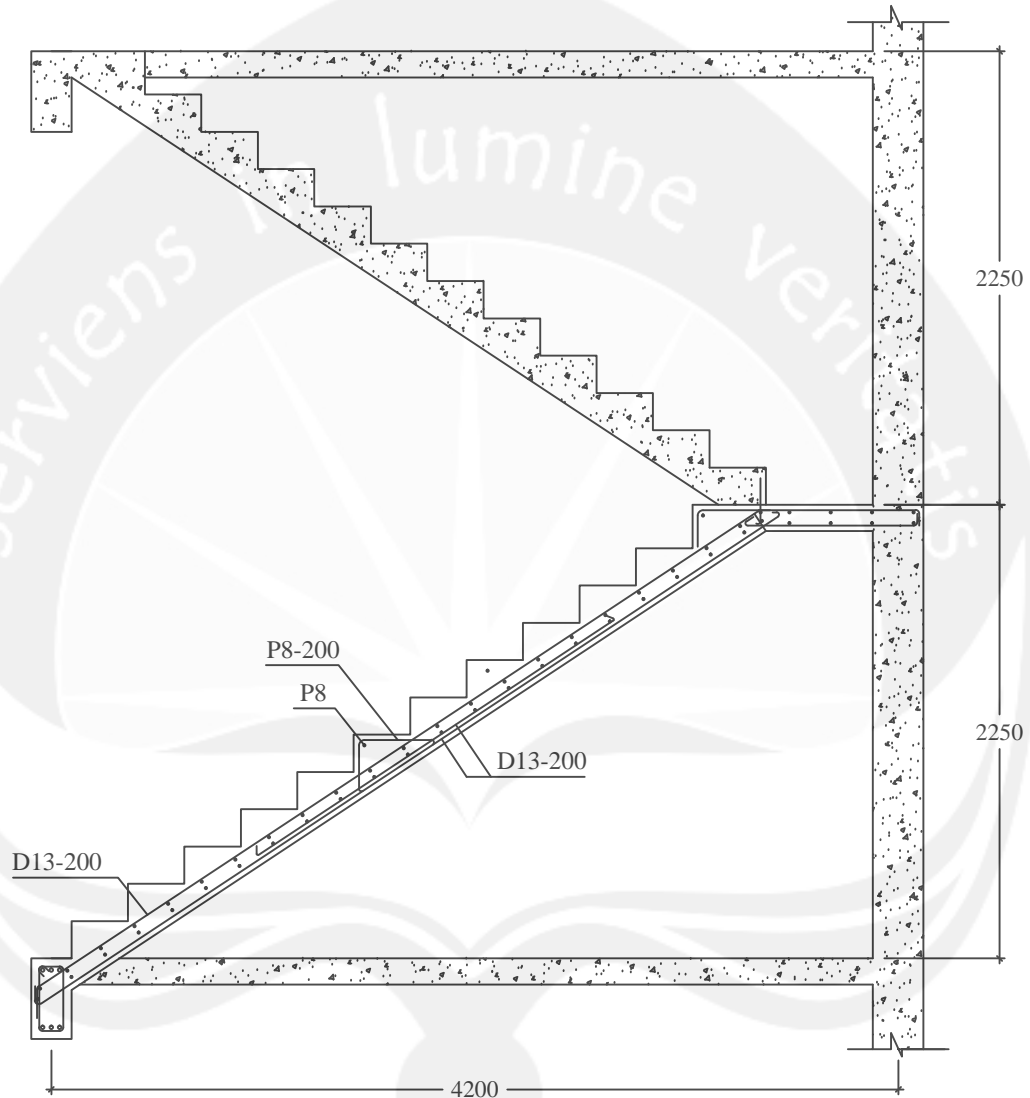
JUDUL GAMBAR

SECTION DESIGN dan
PENULANGAN DINDING
STRUKTUR

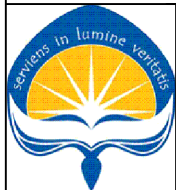
PARAF

SKALA

1 : 50
1 : 25



DETAIL PENULANGAN TANGGA
Skala 1 : 75



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JUDUL GAMBAR

DETAIL PENULANGAN
TANGGA

PARAF

SKALA

1 : 75