DAFTAR GAMBAR

Gambar 2.1. Jenis - Jenis Kolom 20
Gambar 2.2 Wilayah Indonesia untuk Spektrum Respons 0,2 detik 38
Gambar 2.3 Wilayah Indonesia untuk Spektrum Respons 1 detik..... 39
Gambar 3.1 Lokasi Pembangunan Rumah Sakit Aminah……..46
Gambar 3.2 Hasil Desain Pemodelan RSAP 53
Gambar 4.1 Peta Lokasi Penelitian……55
Gambar 4.2 Spektrum Respon Desain 59
Gambar 4.3 Pemodelan Struktur 3D View 59
Gambar 4.4 Hasil Analisis Robot Structural Analysis Professional..... 60
Gambar 4.5 Gambar Penulangan Balok Menggunakan Aplikasi RSAP 2024 64
Gambar 4.6 Gambar Penulangan Balok Menggunakan Aplikasi Autocad..... 64
Gambar 4.7 Gambar Penulangan Kolom Menggunakan Aplikasi RSAP 2024.... 68
Gambar 4.8 Gambar Penulangan Kolom Menggunakan Aplikasi Autocad 68
Gambar 4.9 Gambar Penulangan Pelat Lantai 71

DAFTAR TABEL

Tabel 2.1 Penelitian Terdahulu 11
Tabel 2.2 Tinggi minimum balok nonprategang 21
Tabel 2.3 Ketebalan minum pelat solid satu arah nonprategang 23
Tabel 2.4 Ketebalan minimum pelat dua arah nonprategang tanpa balok interior 23
Tabel 2.5 Berat Sendiri Bahan Bangunan dan Komponen Gedung 24
Tabel 2.6 Beban hidup lantai bangunan gedung 26
Tabel 2.7 Kombinasi Beban 27
Tabel 2.8 Faktor R,Cd dan Ω0 untuk sistem pemikul gaya seismic 28
Tabel 2.9 Klasifikasi Situs 37
Tabel 2.10 Koefesien Situs Fa 40
Tabel 2.11 Koefesien Situs Fv 40
Tabel 2.12 Kategori Desain Seismik Berdasarkan Parameter Respons Percepatan pada Periode Pendek 41
Tabel 2.13 Kategori Desain Seismik Berdasarkan Parameter Respons Percepatan pada Periode 1 detik 41
Tabel 2.14 Kategori Resiko Bangunan Gedung dan Non Gedung untuk 41
Tabel 2.15 Faktor Keutamaan Gempa 44
Tabel 3.1 Waktu Penelitian……47
Tabel 3.2 Jadwal Penyusunan Skripsi 54
Tabel 4.1 Dimensi Balok…….. ……56
Tabel 4.2 Dimensi Kolom 56
Tabel 4.3 Dimensi Pelat 57
Tabel 4.4 Momen dan Penulangan Balok 60
Tabel 4.5 Momen dan Penulangan Kolom 65
Tabel 4.6 Momen dan Penulangan Pelat 69
Tabel 4.7 Evaluasi Hasil Penulangan RSAP Dengan Gambar Rencana 72

1 Level:

- Name : Balok B1 (400 X 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam401 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**3.50**	**0.30**
	Span length:	L_o = 4.00 (m)			
	Section	from 0.00 to 3.50 (m) 400 x 700 (mm) without left slab without right slab			

2.2.2	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P2	**Span**	**0.30**	**3.50**	**0.70**
	Span length:	L_o = 4.00 (m)			
	Section	from 0.00 to 3.50 (m) 400 x 700 (mm) without left slab without right slab			

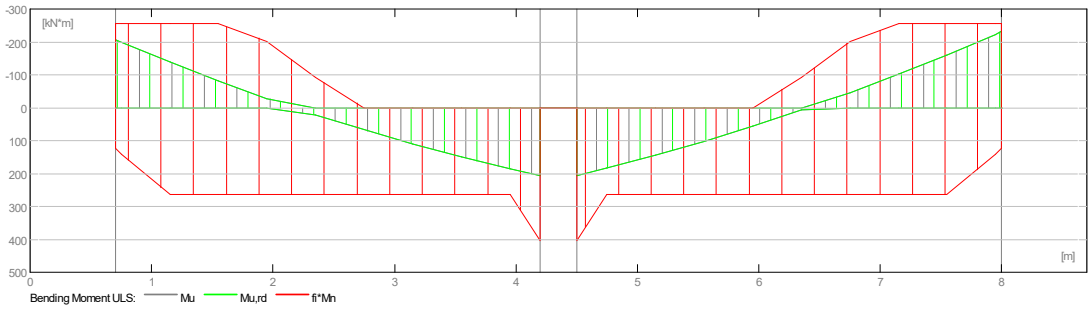
2.3 Calculation options:

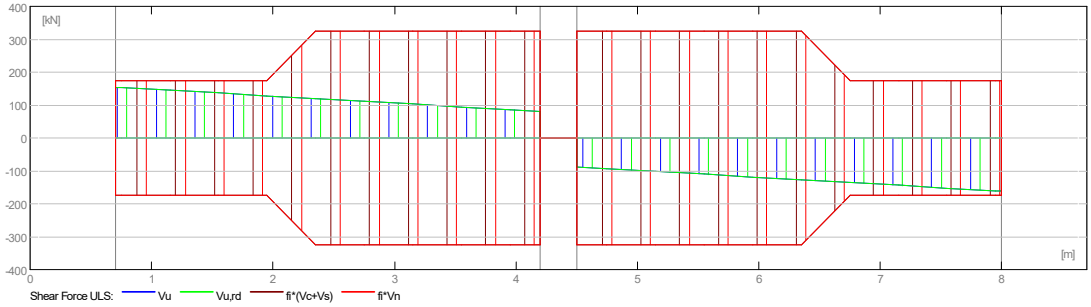
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

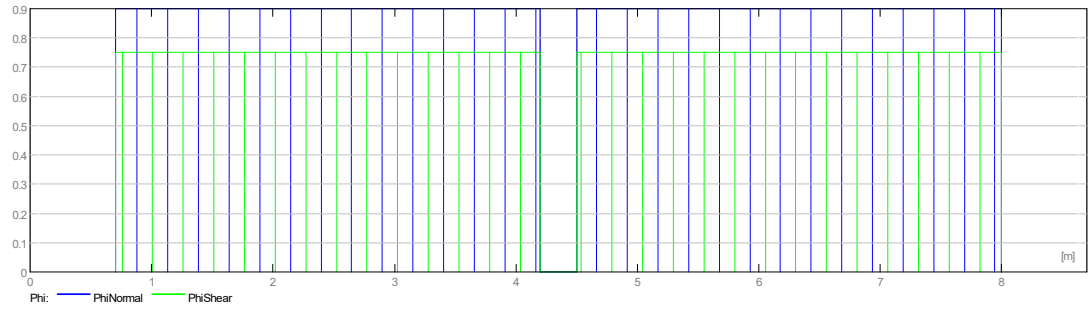
2.4 Calculation results:

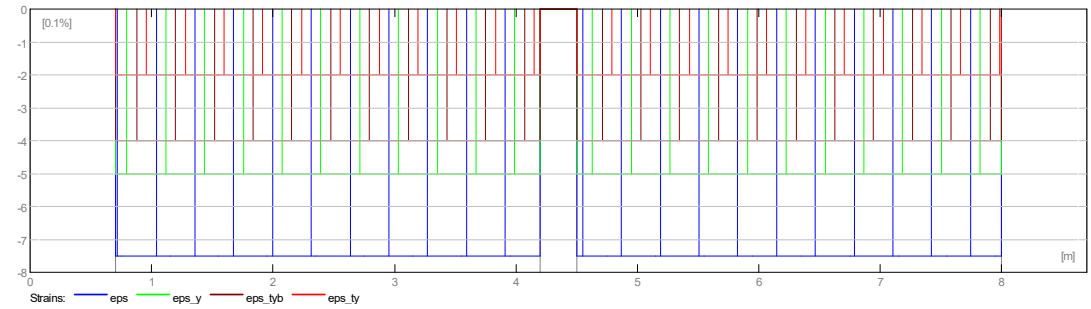
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	206.26	-28.52	-205.35	206.26	154.46	80.87
P2	205.26	-45.72	205.26	-231.54	-88.07	-161.65



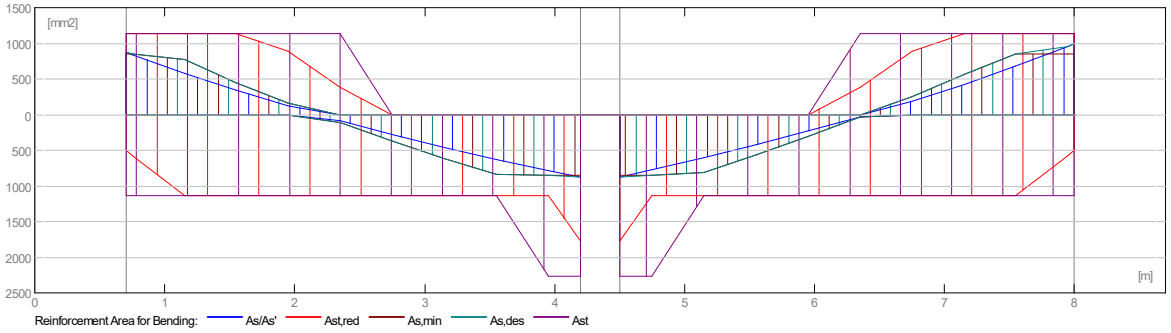


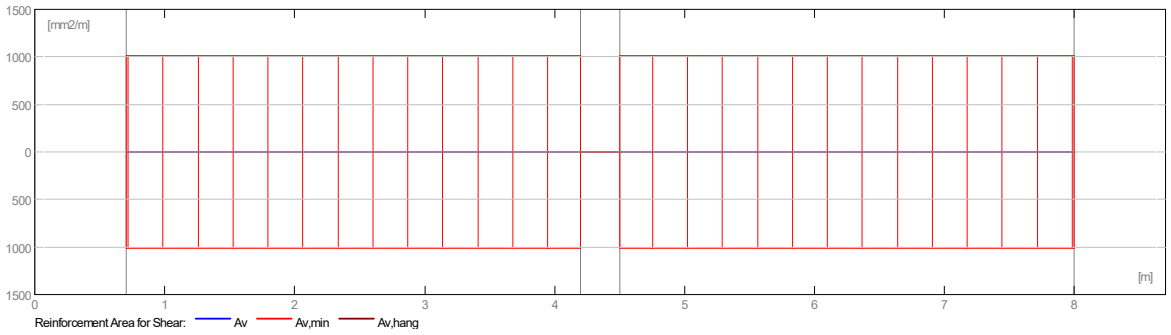




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	877	0	0	873	877	0
P2	873	0	873	0	0	989

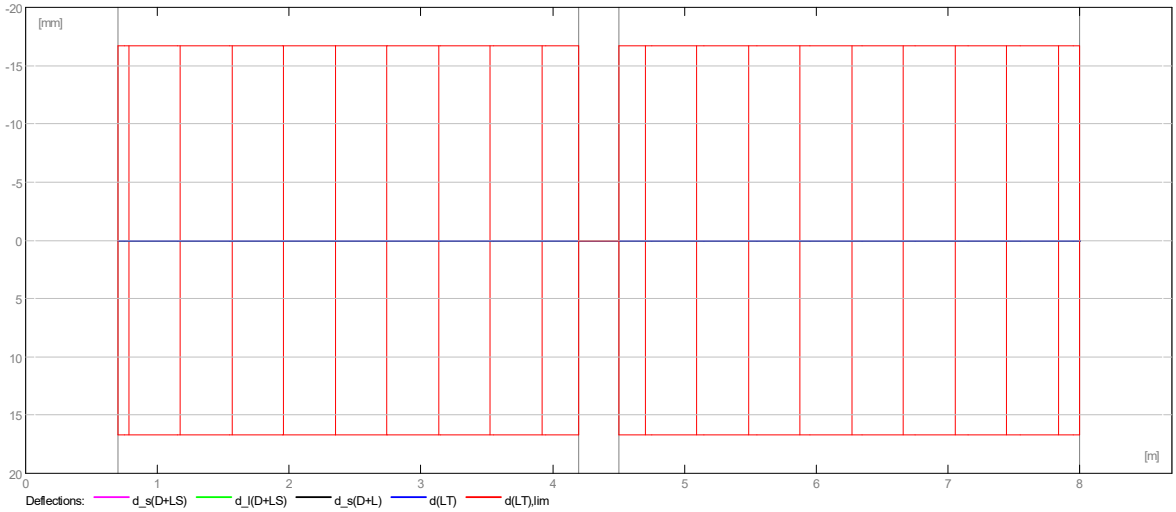




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-17
P2	0	0	0	0	-17



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.70 to 4.20 (m)

Abscissa (m)	ULS Mu,max. (kN*m)	ULS Mu,min. (kN*m)	SLS Mu,max. (kN*m)	SLS Mu,min. (kN*m)	As (mm2)	As' (mm2)
0.70	0.00	-205.35	0.00	0.00	0	873
0.75	0.00	-197.47	0.00	0.00	0	839
1.15	0.00	-137.79	0.00	0.00	0	580
1.55	0.00	-81.47	0.00	0.00	0	341
1.95	0.00	-28.52	0.00	0.00	0	118
2.35	21.07	-0.00	0.00	0.00	87	0
2.75	67.29	-0.00	0.00	0.00	281	0
3.15	110.15	-0.00	0.00	0.00	462	0
3.55	149.65	-0.00	0.00	0.00	631	0
3.95	185.78	-0.00	0.00	0.00	788	0
4.20	206.26	-0.00	0.00	0.00	877	0

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	154.46	0.00
0.75	153.40	0.00
1.15	144.99	0.00
1.55	136.59	0.00
1.95	128.18	0.00
2.35	119.77	0.00
2.75	111.36	0.00
3.15	102.95	0.00
3.55	94.54	0.00
3.95	86.13	0.00
4.20	80.87	0.00

2.5.2 P2 : Span from 4.50 to 8.00 (m)

Abscissa (m)	ULS Mu,max. (kN*m)	ULS Mu,min. (kN*m)	SLS Mu,max. (kN*m)	SLS Mu,min. (kN*m)	As (mm2)	As' (mm2)
4.50	205.26	-0.00	0.00	0.00	873	0
4.75	182.98	-0.00	0.00	0.00	776	0
5.15	143.97	-0.00	0.00	0.00	607	0
5.55	101.59	-0.00	0.00	0.00	426	0
5.95	55.85	-0.00	0.00	0.00	233	0
6.35	6.75	-0.00	0.00	0.00	28	0
6.75	0.00	-45.72	0.00	0.00	0	190
7.15	0.00	-101.55	0.00	0.00	0	426
7.55	0.00	-160.74	0.00	0.00	0	679
7.95	0.00	-223.30	0.00	0.00	0	952
8.00	0.00	-231.54	0.00	0.00	0	989

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
4.50	-88.07	0.00
4.75	-93.33	0.00
5.15	-101.74	0.00
5.55	-110.14	0.00
5.95	-118.55	0.00
6.35	-126.96	0.00
6.75	-135.37	0.00
7.15	-143.78	0.00
7.55	-152.19	0.00
7.95	-160.60	0.00
8.00	-161.65	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.70 to 4.20 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  4 ϕ19 l = 4.50 from 0.40 to 4.89
- assembling (top) (Grade 420)
  4 ϕ19 l = 4.27 from 0.04 to 4.31
- support (Grade 420)
  4 ϕ19 l = 2.87 from 0.04 to 2.65

Transversal reinforcement:

- main (Grade 300)
  stirrups 12 ϕ10 l = 2.00
  e = 1*0.05 + 11*0.31 (m)12 ϕ10 l = 1.62
  e = 1*0.05 + 11*0.31 (m)

2.6.2 P2 : Span from 4.50 to 8.00 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  4 ϕ19 l = 4.50 from 3.81 to 8.30
- assembling (top) (Grade 420)
  4 ϕ19 l = 4.27 from 4.39 to 8.66
- support (Grade 420)
  4 ϕ19 l = 2.87 from 6.05 to 8.66

Transversal reinforcement:

- main (Grade 300)
  stirrups 12 ϕ10 l = 2.00
  e = 1*0.05 + 11*0.31 (m)12 ϕ10 l = 1.62
  e = 1*0.05 + 11*0.31 (m)

3 Material survey:

- Concrete volume = 2.44 (m3)
- Formwork = 15.54 (m2)

- Steel Grade 420
  - Total weight = 207.33 (kG)
  - Density = 85.11 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	93.12	207.33

- Steel Grade 300
  - Total weight = 53.53 (kG)
  - Density = 21.98 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	86.80	53.53

1 Level:

- Name : Balok B2 (400 X 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam218 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**7.35**	**0.60**
	Span length:	L_o = 8.00 (m)			
	Section	from 0.00 to 7.35 (m) 400 x 700 (mm) without left slab without right slab			

2.3 Adjoining beams:

Name	Shape	Span	X* (m)	Z* (m)	DX (m)	DZ (m)	
BR 8 250x500 (Bar 793)		0.50	rect.	P1	3.53	0.20	0.25

* - coordinates of lower left corner of the adjoining beam

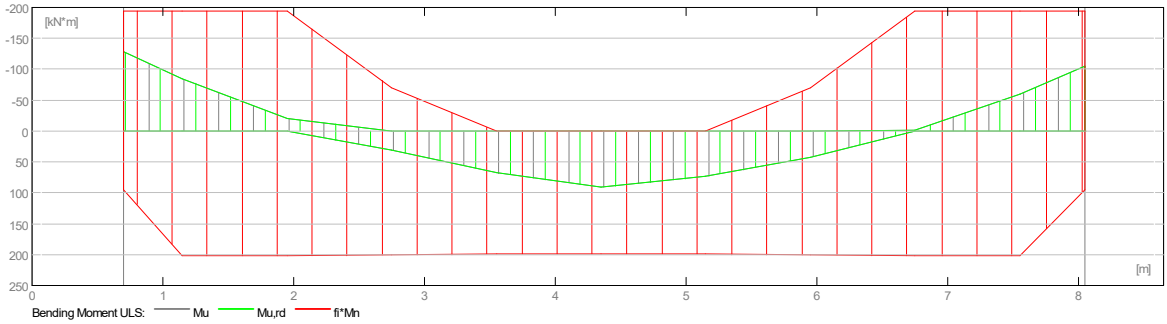
2.4 Calculation options:

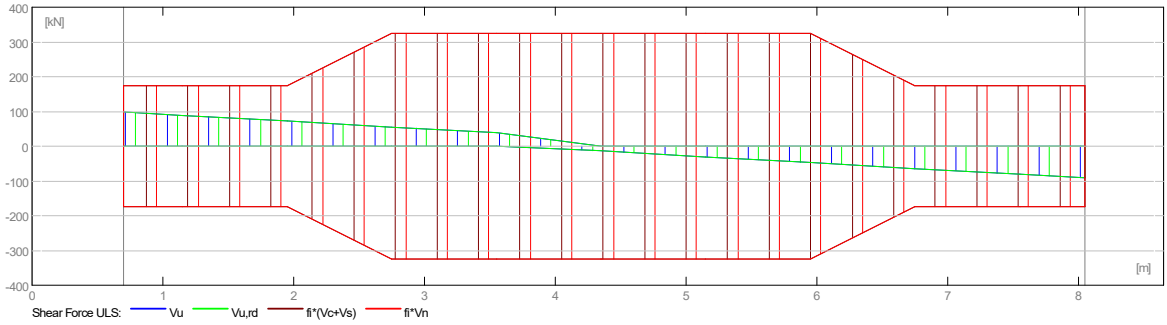
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

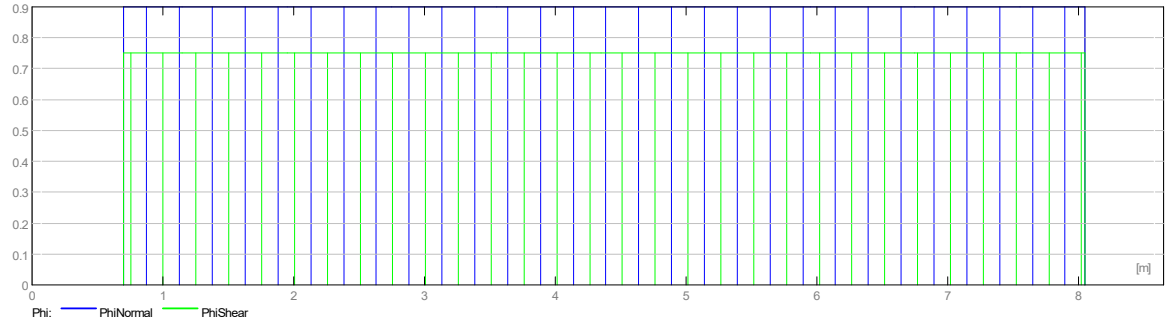
2.5 Calculation results:

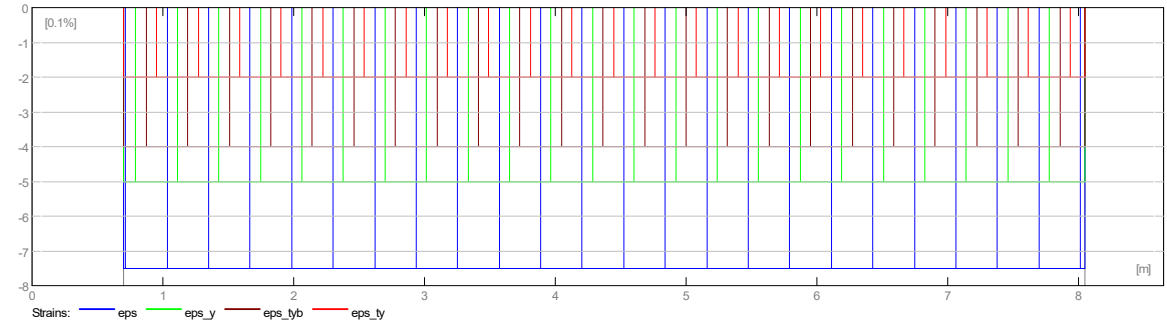
2.5.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	91.18	-0.00	-128.15	-104.48	98.16	-91.35





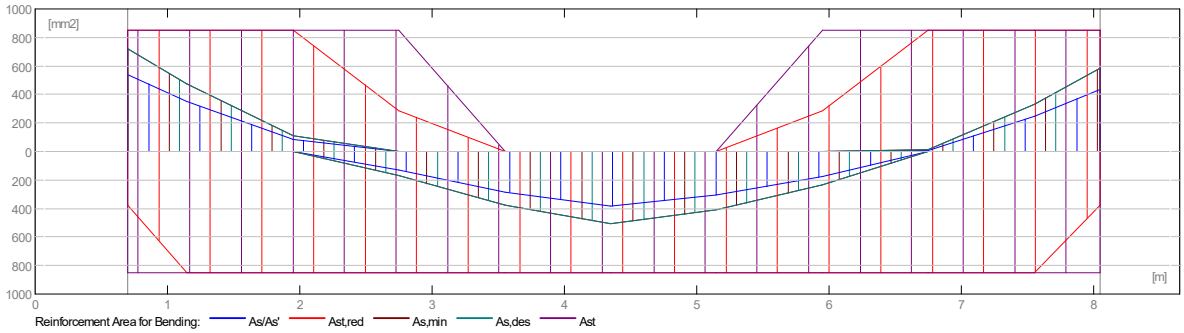


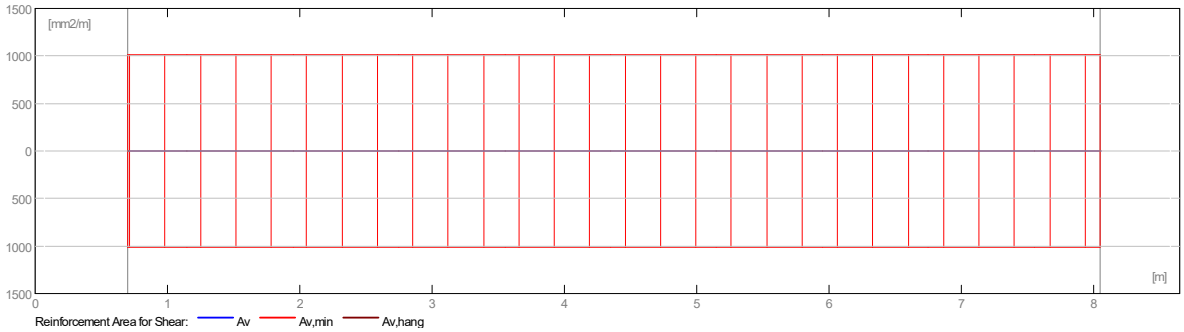


2.5.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top

P1	382	0	0	539	0	438

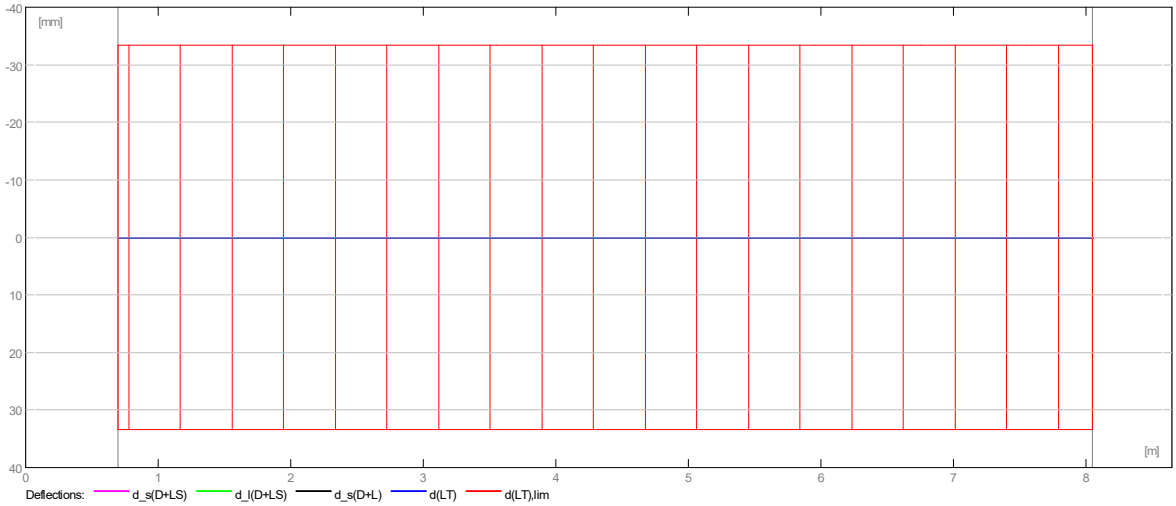




2.5.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-33



2.6 Theoretical results - detailed results:

2.6.1 P1 : Span from 0.70 to 8.05 (m)

	ULS		SLS			
Abscissa	Mu,max.	Mu,min.	Mu,max.	Mu,min.	As	As'

(m)	(kN*m)	(kN*m)	(kN*m)	(kN*m)	(mm2)	(mm2)
0.70	0.00	-128.15	0.00	0.00	0	539
1.15	0.00	-84.45	0.00	0.00	0	353
1.95	0.00	-20.22	0.00	0.00	0	84
2.75	30.55	-0.00	0.00	0.00	127	0
3.55	67.87	-0.00	0.00	0.00	283	0
4.35	91.18	-0.00	0.00	0.00	382	0
5.15	73.60	-0.00	0.00	0.00	307	0
5.95	42.57	-0.00	0.00	0.00	177	0
6.75	0.00	-1.92	0.00	0.00	0	8
7.55	0.00	-59.86	0.00	0.00	0	249
8.05	0.00	-104.48	0.00	0.00	0	438

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	98.16	0.00
1.15	88.70	0.00
1.95	71.88	0.00
2.75	55.06	0.00
3.55	38.24	0.00
4.35	-13.56	0.00
5.15	-30.38	0.00
5.95	-47.20	0.00
6.75	-64.02	0.00
7.55	-80.84	0.00
8.05	-91.35	0.00

2.7 Reinforcement:

2.7.1 P1 : Span from 0.70 to 8.05 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  3 ϕ19 l = 7.96 from 0.40 to 8.35
- assembling (top) (Grade 420)
  3 ϕ19 l = 8.57 from 0.04 to 8.61
- support (Grade 420)
  3 ϕ19 l = 3.27 from 0.04 to 3.05
  3 ϕ19 l = 3.22 from 5.65 to 8.61

Transversal reinforcement:

- main (Grade 300)
  stirrups 24 ϕ10 l = 1.48
  e = 1*0.11 + 23*0.31 (m)24 ϕ10 l = 2.00
  e = 1*0.11 + 23*0.31 (m)

3 Material survey:

- Concrete volume = 2.42 (m3)
- Formwork = 15.61 (m2)

- Steel Grade 420
  - Total weight = 153.77 (kG)
  - Density = 63.49 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	69.07	153.77

- Steel Grade 300
  - Total weight = 51.38 (kG)
  - Density = 21.21 (kG/m3)

- Average diameter = 10.0 (mm)
- Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	83.31	51.38

1 Level:

- Name : Balok B3 (400 X 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam692 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.40**	**7.60**	**0.40**
	Span length:	L_o = 8.00 (m)			
	Section	from 0.00 to 7.60 (m) 300 x 700 (mm) without left slab without right slab			

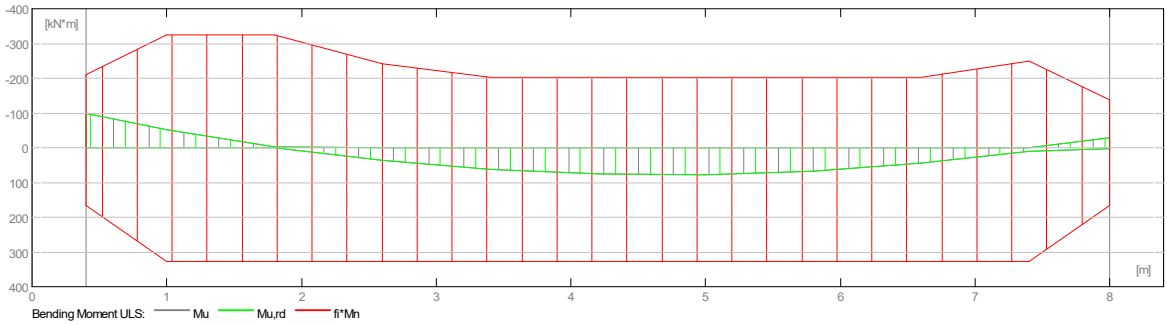
2.3 Calculation options:

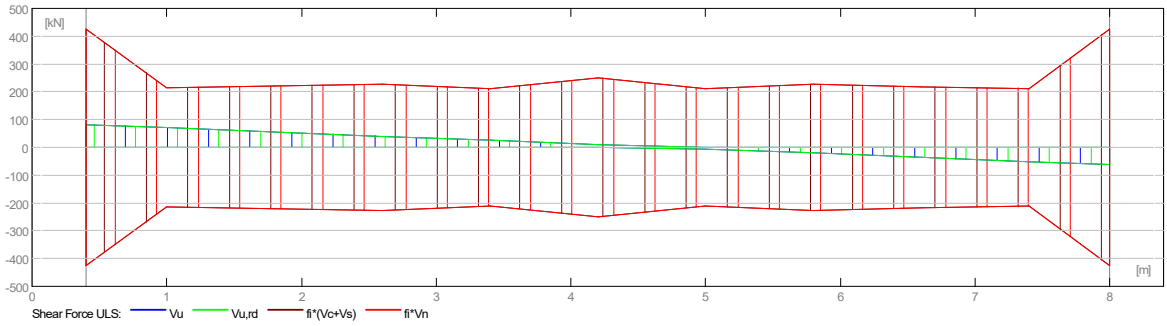
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

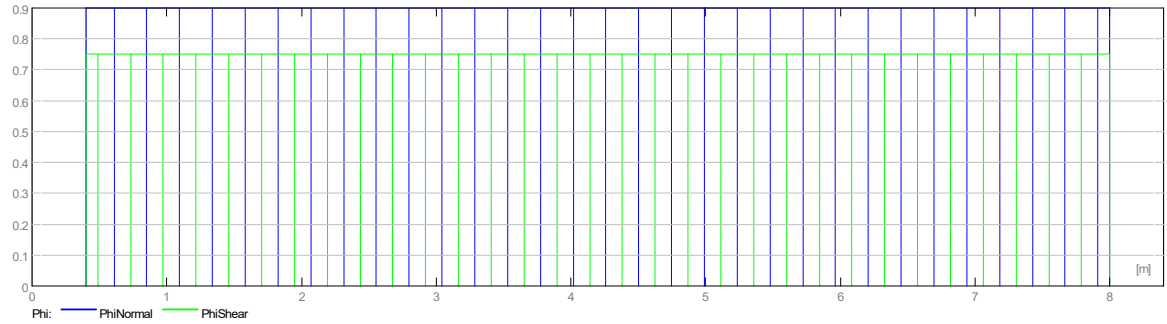
2.4 Calculation results:

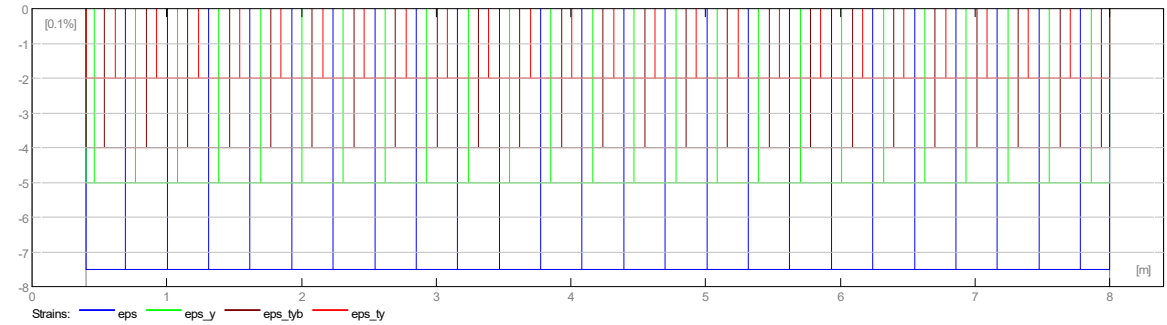
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	77.67	-0.00	-99.52	-27.81	81.99	-62.47



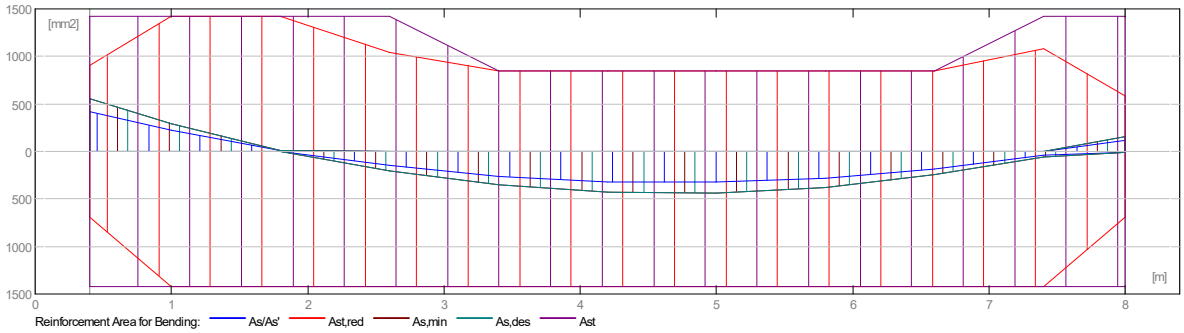


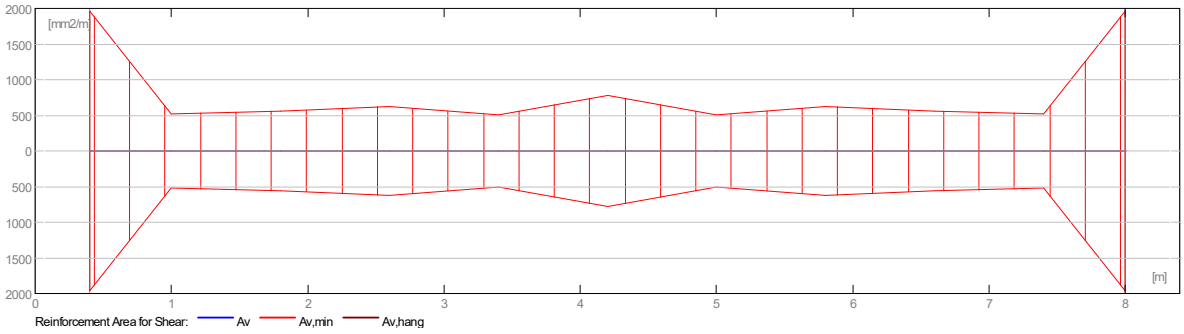




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	326	0	0	419	10	115

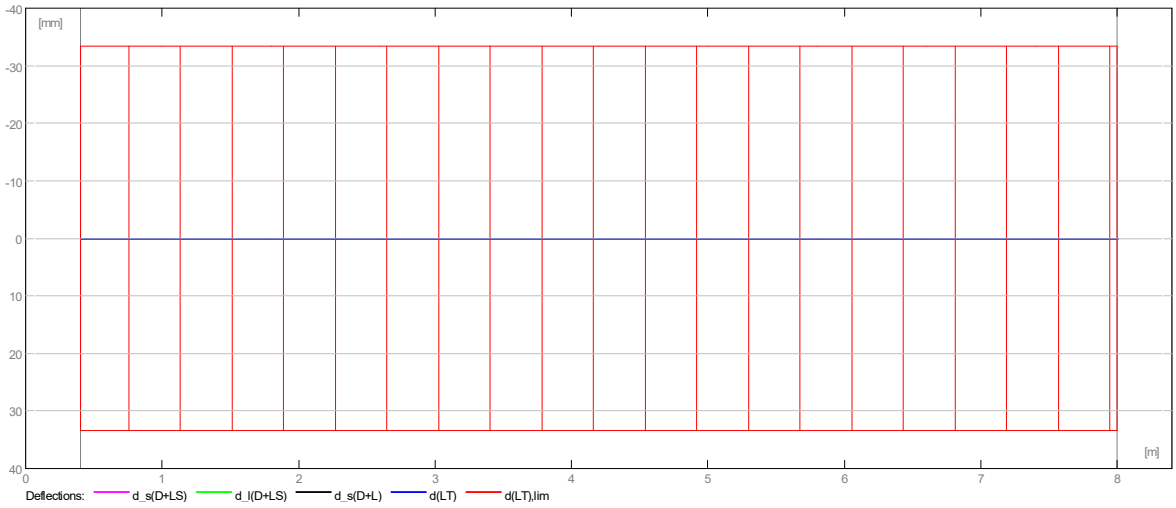




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-33



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.40 to 8.00 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)

0.40	0.00	-99.52	0.00	0.00	0	419
1.00	0.00	-52.60	0.00	0.00	0	220
1.80	0.00	-2.22	0.00	0.00	0	9
2.60	36.00	-0.00	0.00	0.00	150	0
3.40	62.06	-0.00	0.00	0.00	259	0
4.20	75.95	-0.00	0.00	0.00	318	0
5.00	77.67	-0.00	0.00	0.00	326	0
5.80	67.23	-0.00	0.00	0.00	281	0
6.60	44.63	-0.00	0.00	0.00	186	0
7.40	9.86	-0.00	0.00	0.00	41	0
8.00	2.46	-27.81	0.00	0.00	10	115

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.40	81.99	0.00
1.00	70.58	0.00
1.80	55.38	0.00
2.60	40.17	0.00
3.40	24.97	0.00
4.20	9.76	0.00
5.00	-5.45	0.00
5.80	-20.65	0.00
6.60	-35.86	0.00
7.40	-51.06	0.00
8.00	-62.47	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.40 to 8.00 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  - 2 ϕ19 l = 8.21 from 0.10 to 8.30
  - 3 ϕ19 l = 8.32 from 8.36 to 0.04
- assembling (top) (Grade 420)
  - 2 ϕ19 l = 8.32 from 0.04 to 8.36
- support (Grade 420)
  - 2 ϕ19 l = 3.12 from 0.04 to 2.90
  - 2 ϕ19 l = 1.32 from 7.04 to 8.36
  - 3 ϕ19 l = 9.60 from 8.40 to 0.02

Transversal reinforcement:

- main (Grade 300)

  stirrups 25 ϕ10 l = 1.80
  e = 1*0.08 + 24*0.31 (m)20 ϕ10 l = 1.98
  e = 1*0.00 + 19*0.40 (m)

3 Material survey:

- Concrete volume = 1.76 (m3)
- Formwork = 14.46 (m2)
- Steel Grade 420
  - Total weight = 213.06 (kG)
  - Density = 120.78 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	95.70	213.06

- Steel Grade 300
  - Total weight = 52.07 (kG)
  - Density = 29.52 (kG/m3)
  - Average diameter = 10.0 (mm)

- Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	84.43	52.07

1 Level:

- Name : Balok B4 (550 X 850) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam1017 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**6.90**	**0.70**
	Span length:	L_o = 7.60 (m)			
	Section	from 0.00 to 6.90 (m) 550 x 850 (mm) without left slab without right slab			

2.3 Adjoining beams:

Name	Shape	Span	X* (m)	Z* (m)	DX (m)	DZ (m)	
BR 400x800 (Bar 1020)		0.80	rect.	P1	5.45	0.05	0.40
BR 3,9,10 300x700 (Bar 658)		0.70	rect.	P1	3.30	0.15	0.30
BR 400x800 (Bar 659)		0.80	rect.	P1	2.45	0.05	0.40

* - coordinates of lower left corner of the adjoining beam

2.4 Calculation options:

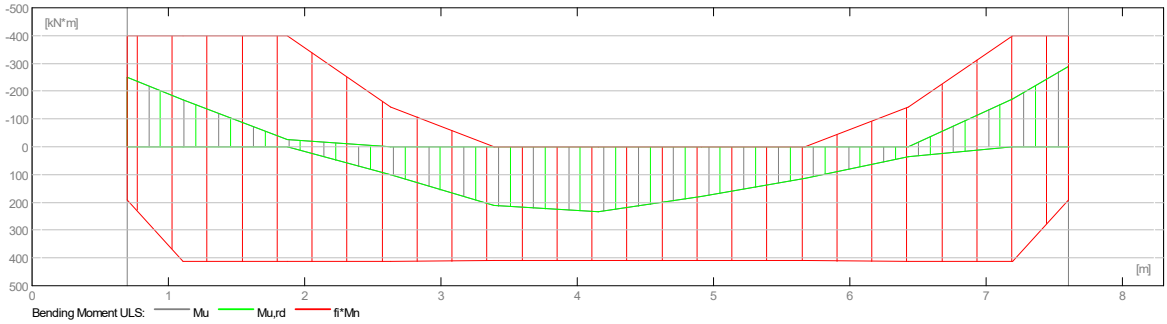
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)

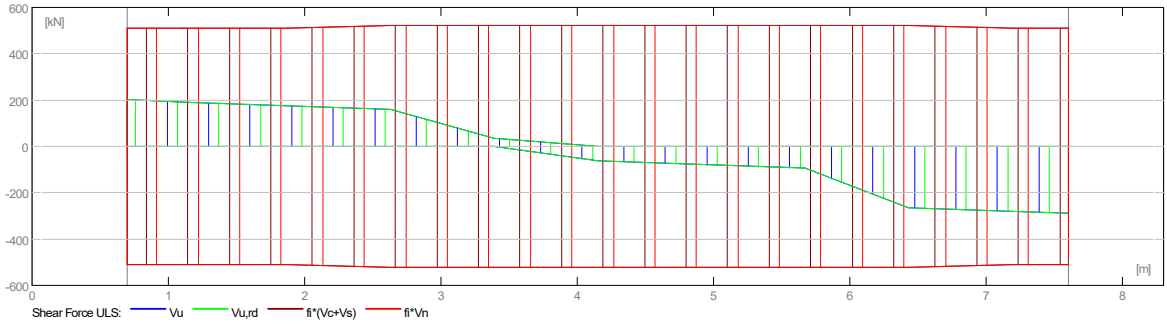
: side c1 = 40 (mm)
: top c2 = 40 (mm)

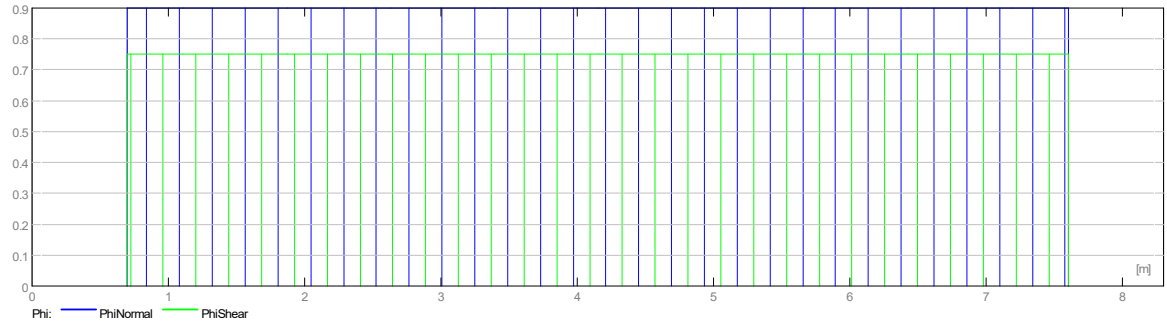
2.5 Calculation results:

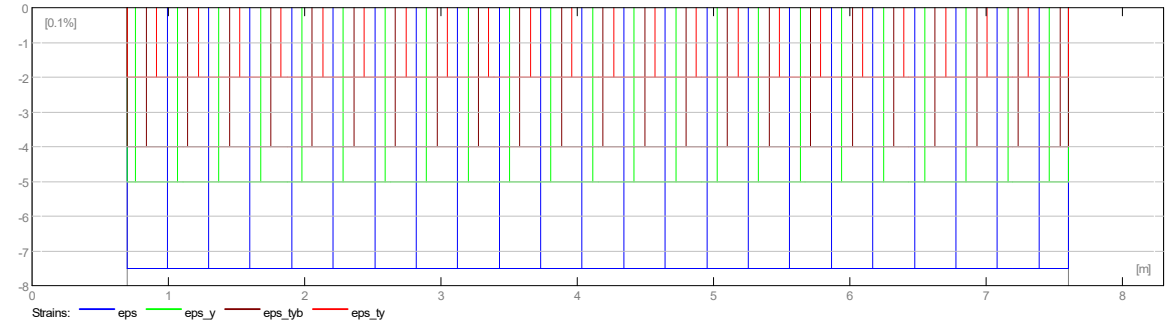
2.5.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	234.17	-0.00	-249.67	-290.33	201.28	-289.37



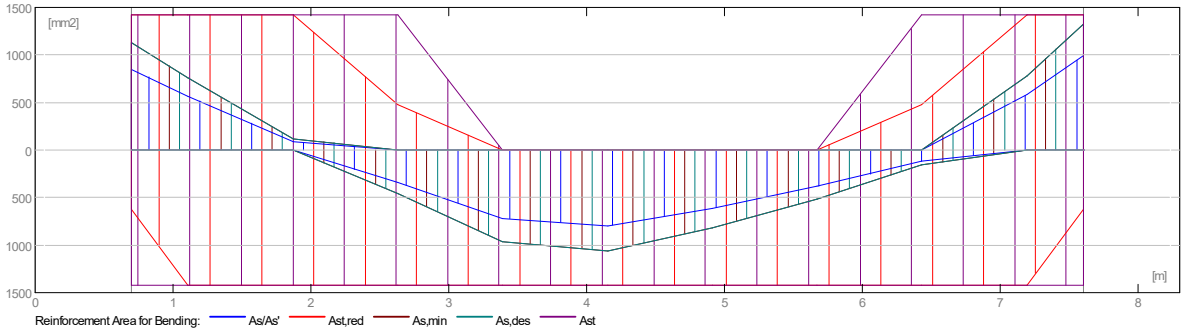


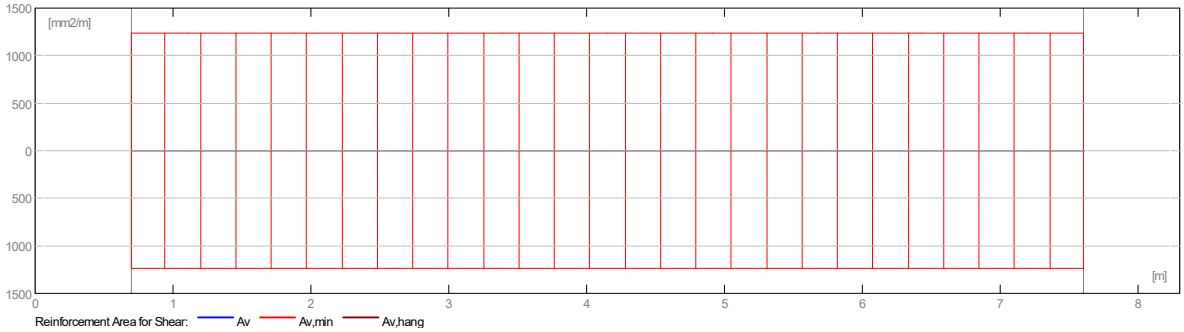




2.5.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	796	0	0	850	0	991

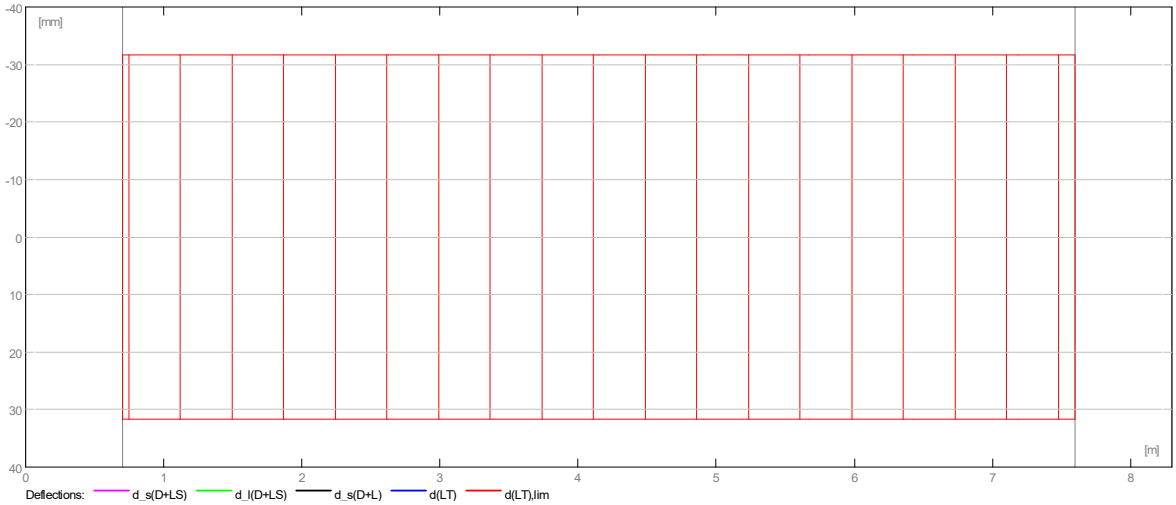




2.5.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS)- long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-32



2.6 Theoretical results - detailed results:

2.6.1 P1 : Span from 0.70 to 7.60 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)
0.70	0.00	-249.67	0.00	0.00	0	850
1.11	0.00	-167.40	0.00	0.00	0	567
1.87	0.00	-27.12	0.00	0.00	0	91
2.63	100.97	-0.00	0.00	0.00	340	0
3.39	212.27	-0.00	0.00	0.00	721	0
4.15	234.17	-0.00	0.00	0.00	796	0
4.91	180.09	-0.00	0.00	0.00	610	0
5.67	113.80	-0.00	0.00	0.00	384	0
6.43	35.29	-0.00	0.00	0.00	118	0
7.19	0.00	-171.94	0.00	0.00	0	582
7.60	0.00	-290.33	0.00	0.00	0	991

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	201.28	0.00
1.11	192.62	0.00
1.87	176.56	0.00
2.63	160.50	0.00
3.39	36.94	0.00
4.15	-63.14	0.00
4.91	-79.19	0.00
5.67	-95.25	0.00
6.43	-264.65	0.00
7.19	-280.71	0.00
7.60	-289.37	0.00

2.7 Reinforcement:

2.7.1 P1 : Span from 0.70 to 7.60 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  5 ϕ19 l = 7.51 from 0.40 to 7.90
- assembling (top) (Grade 420)
  5 ϕ19 l = 8.22 from 0.04 to 8.26
- support (Grade 420)
  5 ϕ19 l = 3.15 from 0.04 to 2.93
  5 ϕ19 l = 2.39 from 6.13 to 8.26

Transversal reinforcement:

- main (Grade 300)
  stirrups 19 ϕ10 l = 2.60
  e = 1*0.03 + 18*0.38 (m)38 ϕ10 l = 1.95
  e = 1*0.03 + 18*0.38 (m)

3 Material survey:

- Concrete volume = 3.88 (m3)
- Formwork = 18.84 (m2)

- Steel Grade 420
  - Total weight = 236.81 (kG)
  - Density = 61.03 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	106.36	236.81

- Steel Grade 300
  - Total weight = 76.10 (kG)
  - Density = 19.61 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	123.38	76.10

1 Level:

- Name :B5 (400 x 800) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam1025 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**9.25**	**0.80**
	Span length:	L_o = 10.00 (m)			
	Section	from 0.00 to 9.25 (m) 400 x 800 (mm) without left slab without right slab			

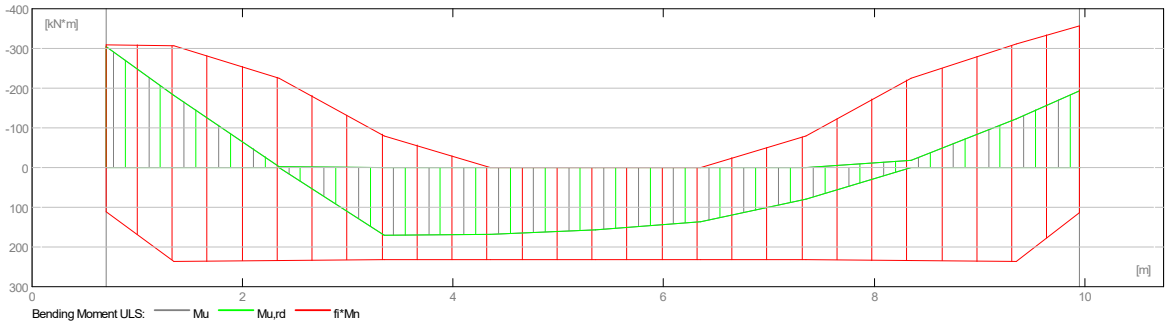
2.3 Calculation options:

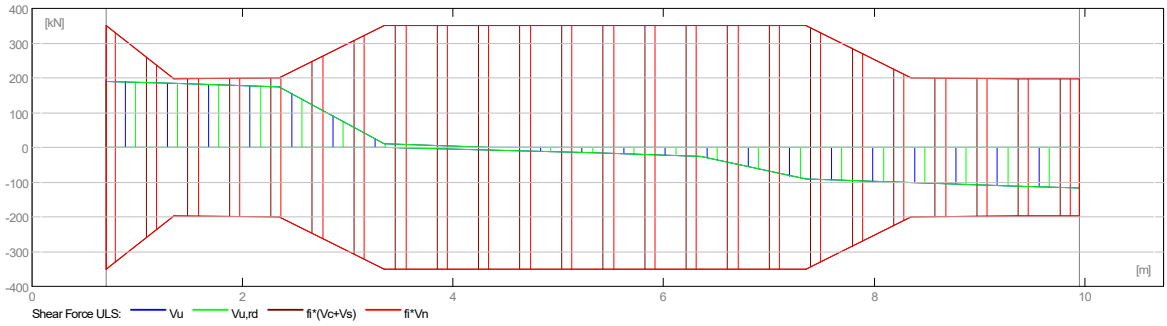
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

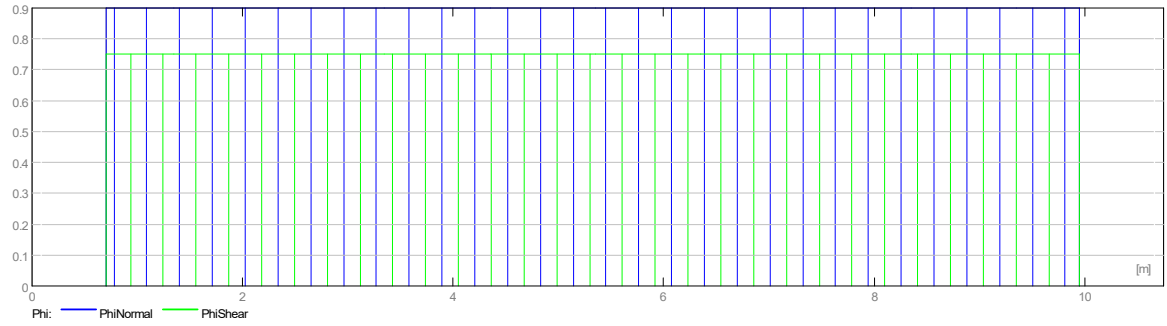
2.4 Calculation results:

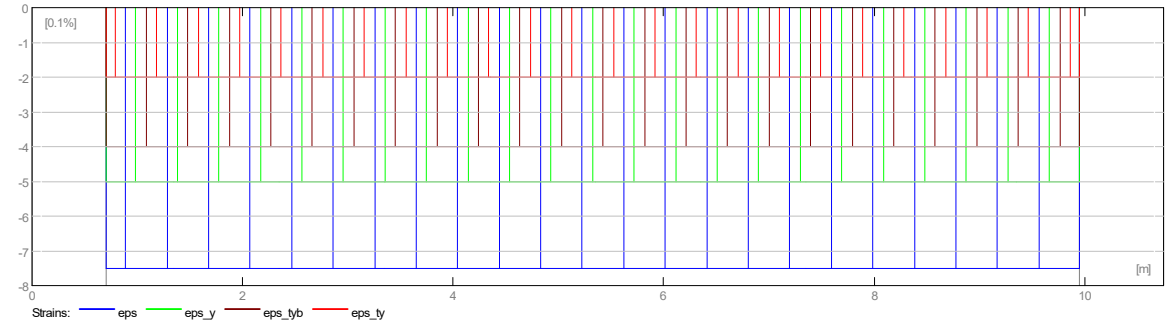
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	170.06	-0.00	-305.39	-192.67	190.29	-115.96



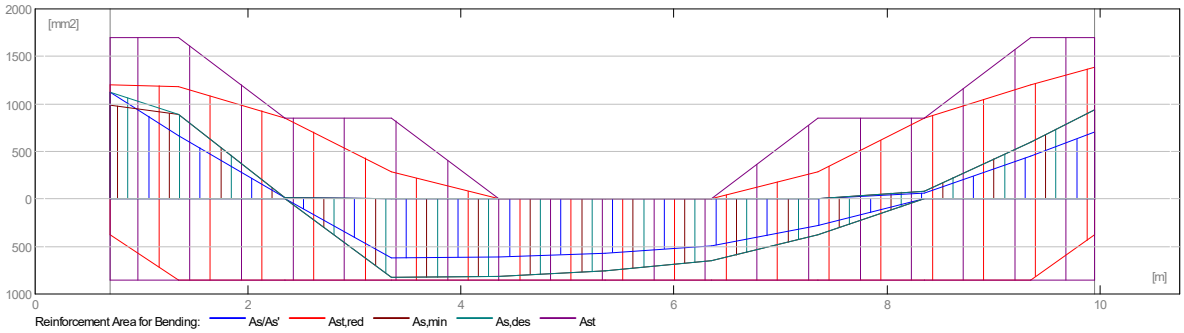


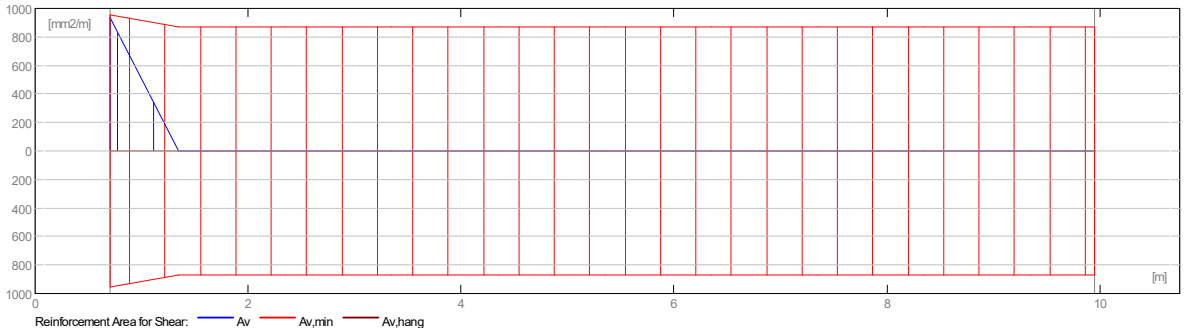




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	619	0	0	1127	0	703

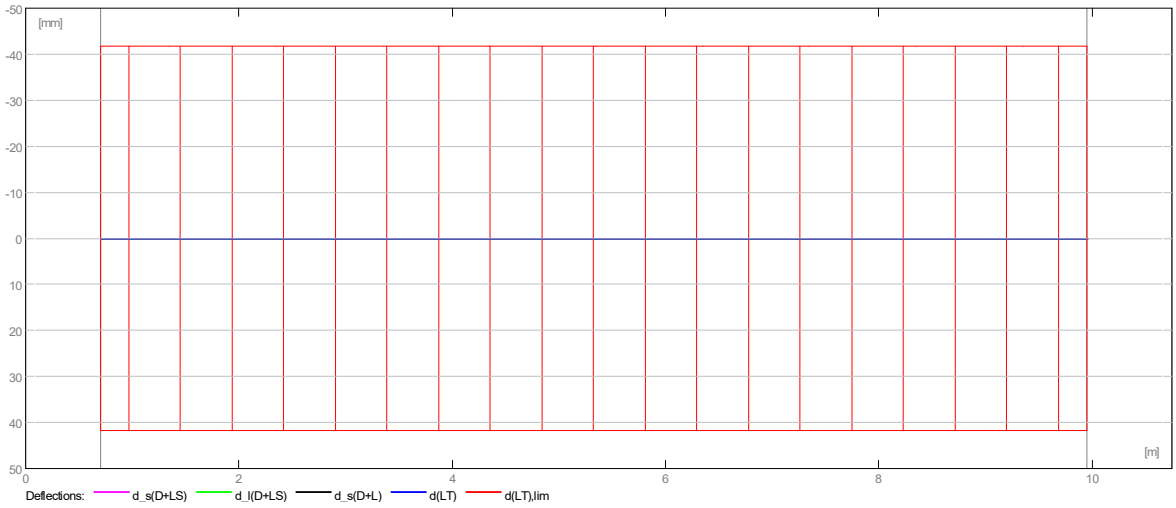




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-42



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.70 to 9.95 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)

0.70	0.00	-305.39	0.00	0.00	0	1127
1.35	0.00	-182.60	0.00	0.00	0	665
2.35	0.00	-2.91	0.00	0.00	0	10
3.35	170.06	-0.00	0.00	0.00	619	0
4.35	167.70	-0.00	0.00	0.00	610	0
5.35	156.13	-0.00	0.00	0.00	567	0
6.35	135.34	-0.00	0.00	0.00	491	0
7.35	78.79	-0.00	0.00	0.00	284	0
8.35	0.00	-17.82	0.00	0.00	0	64
9.35	0.00	-123.65	0.00	0.00	0	448
9.95	0.00	-192.67	0.00	0.00	0	703

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	190.29	0.00
1.35	184.30	0.00
2.35	175.08	0.00
3.35	11.31	0.00
4.35	-6.96	0.00
5.35	-16.18	0.00
6.35	-25.40	0.00
7.35	-92.00	0.00
8.35	-101.22	0.00
9.35	-110.43	0.00
9.95	-115.96	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.70 to 9.95 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  3 ϕ19 l = 9.86 from 0.40 to 10.25
- assembling (top) (Grade 420)
  3 ϕ19 l = 10.67 from 0.04 to 10.71
- support (Grade 420)
  3 ϕ19 l = 3.61 from 0.04 to 3.65
  3 ϕ19 l = 1.61 from 0.09 to 1.70
  3 ϕ19 l = 3.66 from 7.05 to 10.71
  3 ϕ19 l = 1.68 from 8.98 to 10.66

Transversal reinforcement:

- main (Grade 300)
  stirrups 25 ϕ10 l = 1.68
  e = 1*0.28 + 1*0.33 + 23*0.36 (m)25 ϕ10 l = 2.20
  e = 1*0.28 + 1*0.33 + 23*0.36 (m)

3 Material survey:

- Concrete volume = 3.44 (m3)
- Formwork = 21.54 (m2)

- Steel Grade 420
  - Total weight = 207.77 (kG)
  - Density = 60.40 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	93.32	207.77

- Steel Grade 300
  - Total weight = 59.69 (kG)
  - Density = 17.35 (kG/m3)

- Average diameter = 10.0 (mm)
- Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	96.78	59.69

1 Level:

- Name : B6 (400 x 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam394 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**2.55**	**0.20**
	Span length:	L_o = 3.00 (m)			
	Section	from 0.00 to 2.55 (m) 400 x 700 (mm) without left slab without right slab			

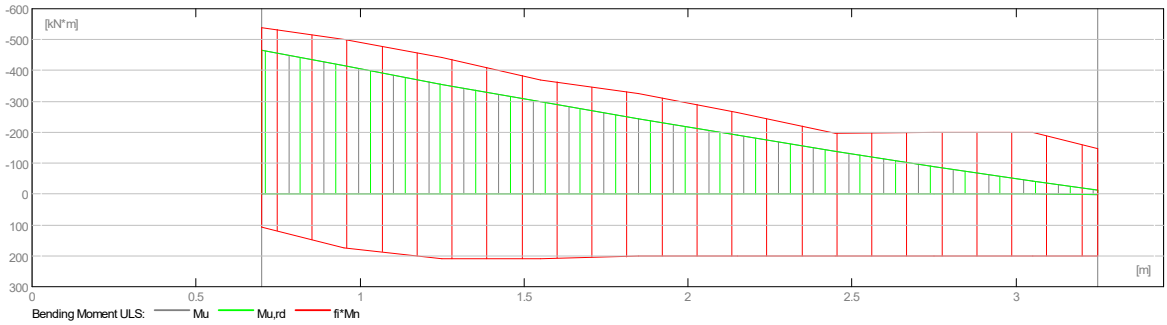
2.3 Calculation options:

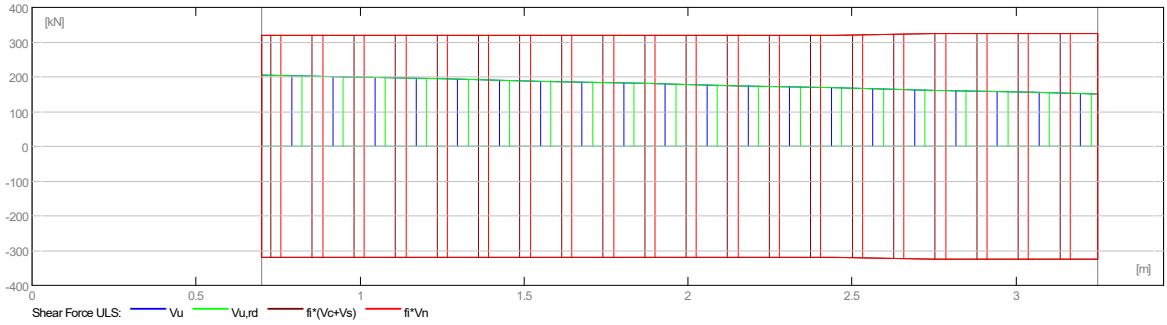
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

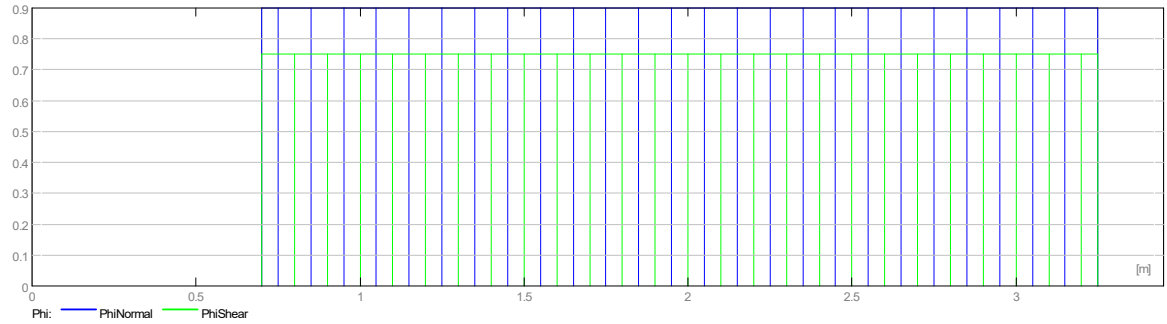
2.4 Calculation results:

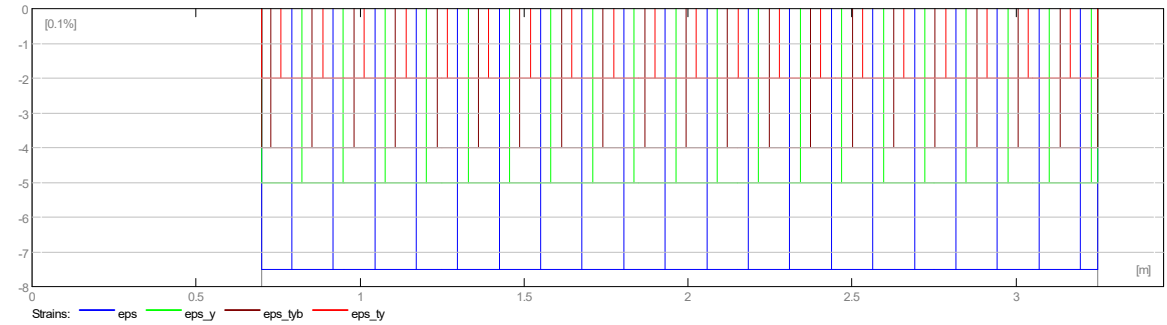
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	3.34	-298.26	-465.28	-13.60	205.28	151.67



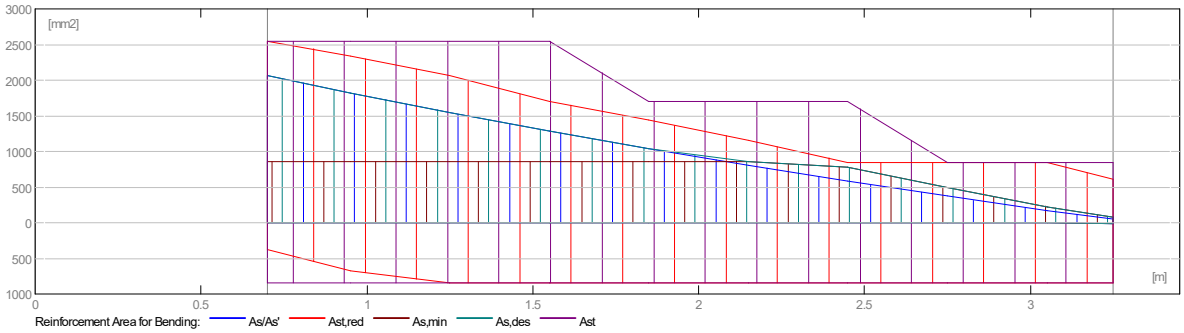


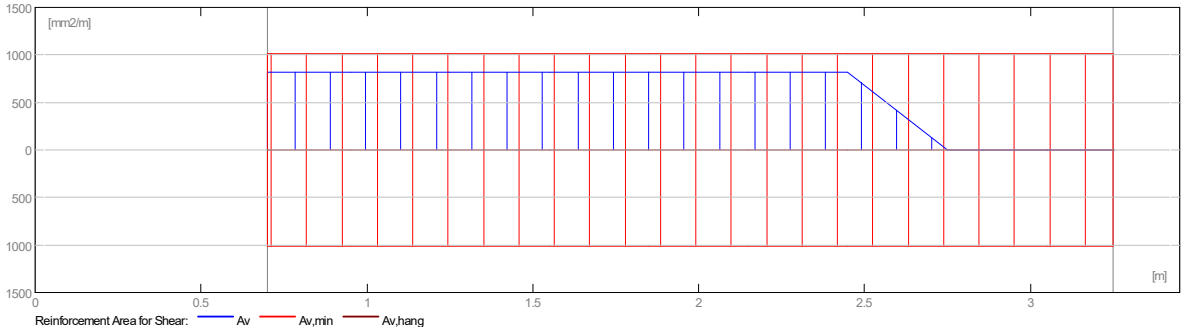




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	14	0	0	2060	14	56

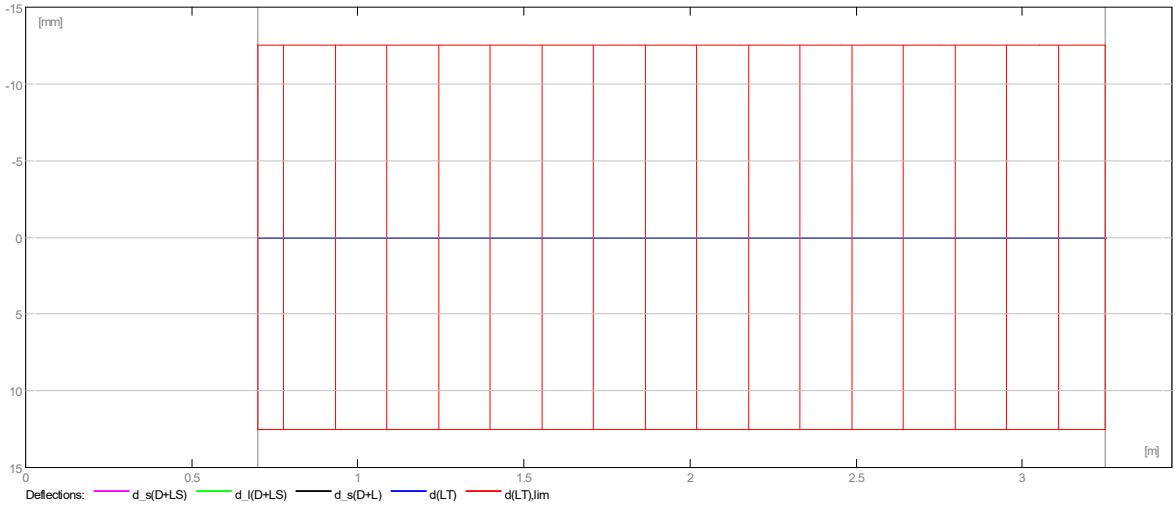




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-13



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.70 to 3.25 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)

0.70	0.00	-465.28	0.00	0.00	0	2060
0.95	0.00	-414.49	0.00	0.00	0	1820
1.25	0.00	-355.43	0.00	0.00	0	1546
1.55	0.00	-298.26	0.00	0.00	0	1286
1.85	0.00	-242.98	0.00	0.00	0	1039
2.15	0.00	-189.60	0.00	0.00	0	805
2.45	0.00	-138.11	0.00	0.00	0	582
2.75	0.00	-88.51	0.00	0.00	0	370
3.05	0.00	-40.80	0.00	0.00	0	170
3.25	3.34	-13.60	0.00	0.00	14	56

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	205.28	0.00
0.95	200.02	0.00
1.25	193.71	0.00
1.55	187.41	0.00
1.85	181.10	0.00
2.15	174.79	0.00
2.45	168.48	0.00
2.75	162.18	0.00
3.05	155.87	0.00
3.25	151.67	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.70 to 3.25 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  3 ϕ19 l = 3.27 from 0.40 to 3.41
- support (Grade 420)
  3 ϕ19 l = 3.88 from 0.04 to 3.41
  3 ϕ19 l = 2.64 from 0.09 to 2.47
  3 ϕ19 l = 1.75 from 0.14 to 1.63

Transversal reinforcement:

- main (Grade 300)
  stirrups 9 ϕ10 l = 1.48
  e = 1*0.04 + 8*0.31 (m) 9 ϕ10 l = 2.00
  e = 1*0.04 + 8*0.31 (m)

3 Material survey:

- Concrete volume = 0.97 (m3)
- Formwork = 6.41 (m2)

- Steel Grade 420
  - Total weight = 77.10 (kG)
  - Density = 79.81 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	34.63	77.10

- Steel Grade 300
  - Total weight = 19.27 (kG)
  - Density = 19.95 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	31.24	19.27

1 Level:

- Name : B7 (200 x 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam546 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.40**	**7.60**	**0.40**
	Span length:	L_o = 8.00 (m)			
	Section	from 0.00 to 7.60 (m) 200 x 700 (mm) without left slab without right slab			

2.3 Adjoining beams:

Name	Shape	Span	X* (m)	Z* (m)	DX (m)	DZ (m)	
BR 8 250x500 (Bar 675)		0.50	rect.	P1	3.68	0.20	0.25

* - coordinates of lower left corner of the adjoining beam

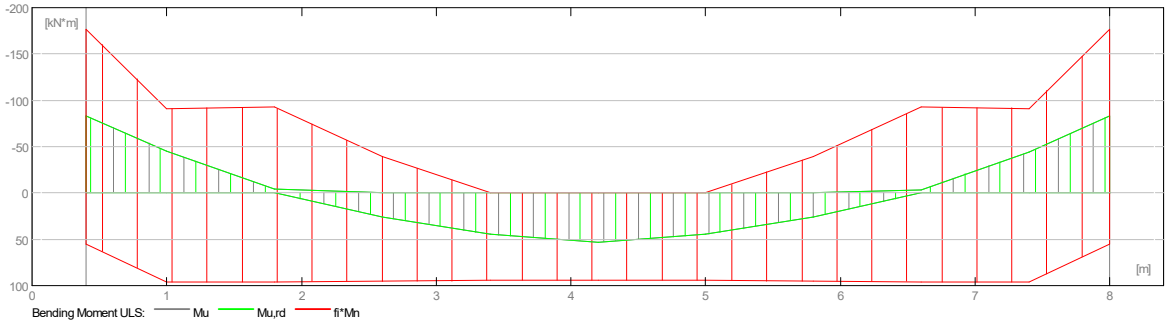
2.4 Calculation options:

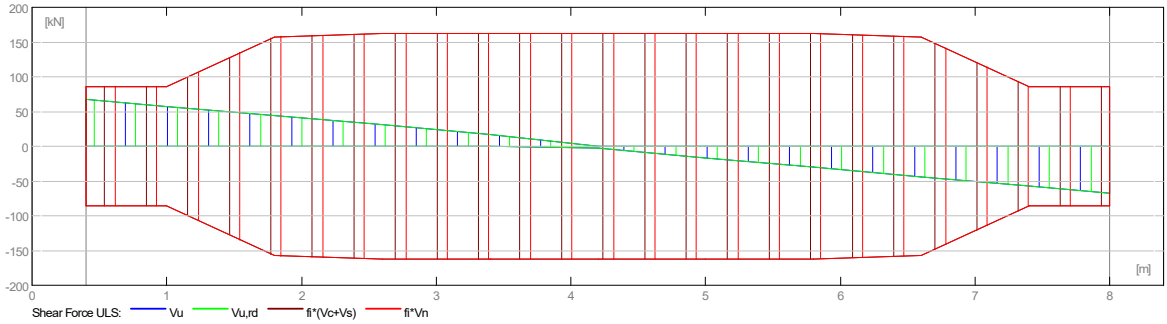
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

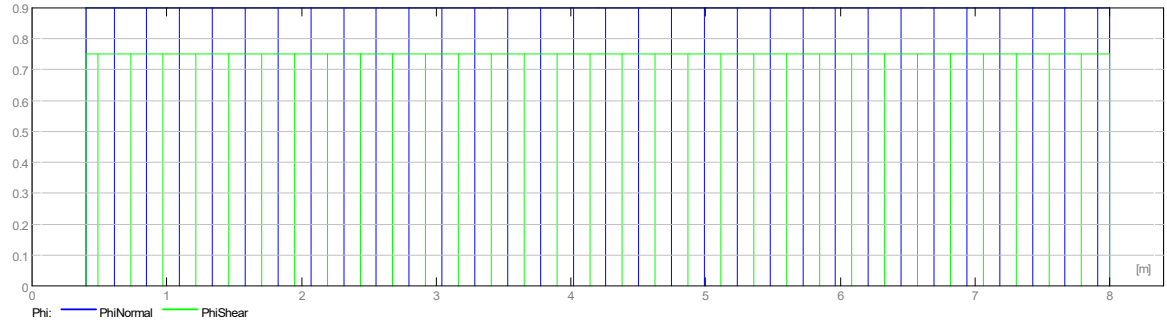
2.5 Calculation results:

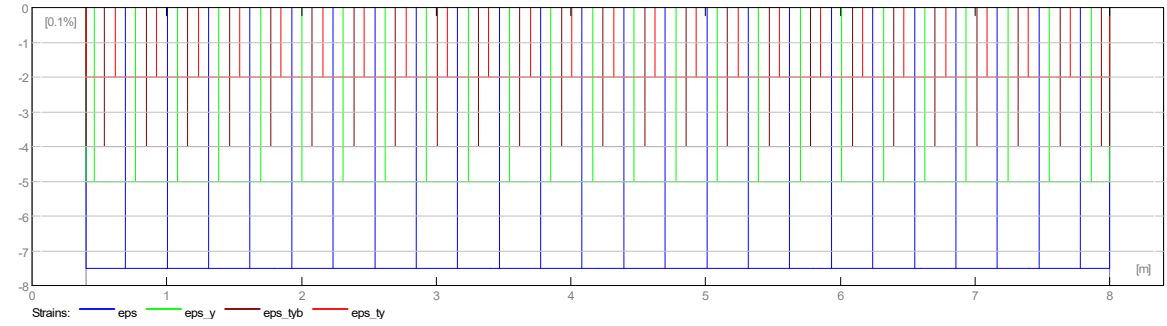
2.5.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	52.82	-0.00	-83.58	-82.87	67.94	-67.72



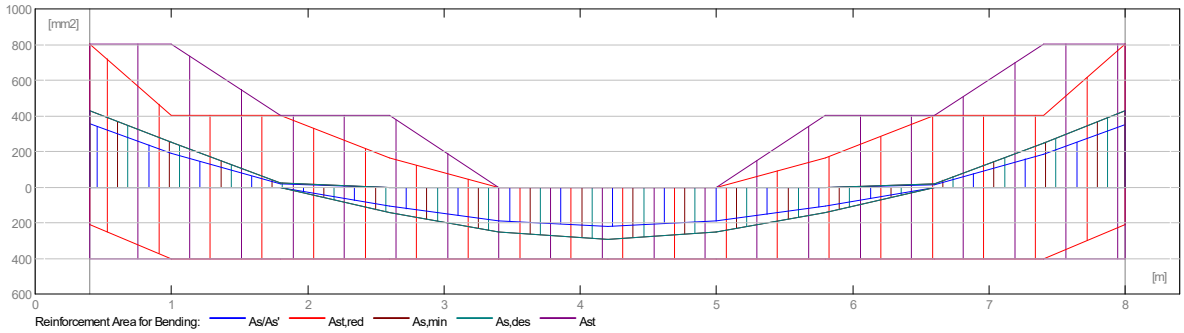


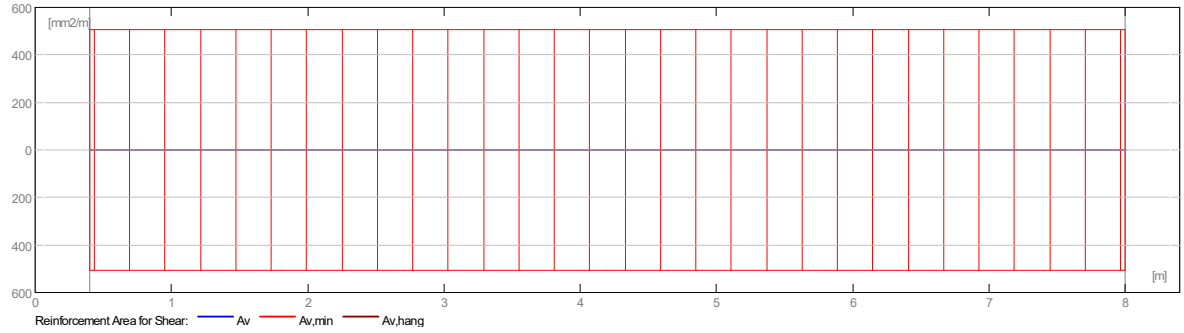




2.5.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	221	0	0	354	0	350

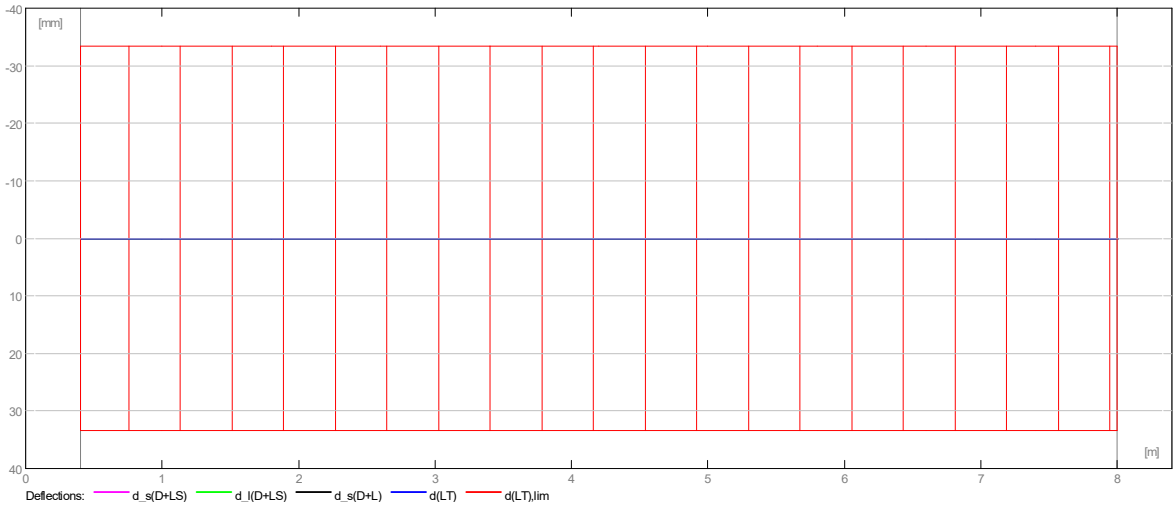




2.5.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-33



2.6 Theoretical results - detailed results:

2.6.1 P1 : Span from 0.40 to 8.00 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)

0.40	0.00	-83.58	0.00	0.00	0	354
1.00	0.00	-44.85	0.00	0.00	0	188
1.80	0.00	-4.09	0.00	0.00	0	17
2.60	25.79	-0.00	0.00	0.00	107	0
3.40	44.80	-0.00	0.00	0.00	187	0
4.20	52.82	-0.00	0.00	0.00	221	0
5.00	44.85	-0.00	0.00	0.00	188	0
5.80	26.02	-0.00	0.00	0.00	108	0
6.60	0.00	-3.69	0.00	0.00	0	15
7.40	0.00	-44.28	0.00	0.00	0	185
8.00	0.00	-82.87	0.00	0.00	0	350

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.40	67.94	0.00
1.00	57.74	0.00
1.80	44.15	0.00
2.60	30.56	0.00
3.40	16.96	0.00
4.20	-3.16	0.00
5.00	-16.75	0.00
5.80	-30.34	0.00
6.60	-43.94	0.00
7.40	-57.53	0.00
8.00	-67.72	0.00

2.7 Reinforcement:

2.7.1 P1 : Span from 0.40 to 8.00 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  2 ϕ16 l = 8.21 from 0.10 to 8.30
- assembling (top) (Grade 420)
  2 ϕ16 l = 8.32 from 0.04 to 8.36
- support (Grade 420)
  2 ϕ16 l = 3.08 from 0.04 to 2.90
  2 ϕ16 l = 1.30 from 0.09 to 1.17
  2 ϕ16 l = 3.08 from 5.50 to 8.36
  2 ϕ16 l = 1.30 from 7.23 to 8.31

Transversal reinforcement:

- main (Grade 300)
  stirrups 25 ϕ10 l = 1.60
  e = 1*0.08 + 24*0.31 (m)

3 Material survey:

- Concrete volume = 1.18 (m3)
- Formwork = 13.56 (m2)

- Steel Grade 420
  - Total weight = 79.86 (kG)
  - Density = 67.91 (kG/m3)
  - Average diameter = 16.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
16	50.58	79.86

- Steel Grade 300
  - Total weight = 24.60 (kG)
  - Density = 20.92 (kG/m3)

- Average diameter = 10.0 (mm)
- Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	39.89	24.60

1 Level:

- Name : B8 (250 x 500) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam674 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1

Span	Position	L.supp. (m)	L (m)	R.supp. (m)
P1	**Span**	**0.40**	**2.70**	**0.20**

Span length: L_o = 3.00 (m)
Section from 0.00 to 2.70 (m)
250 x 500 (mm)
without left slab
without right slab

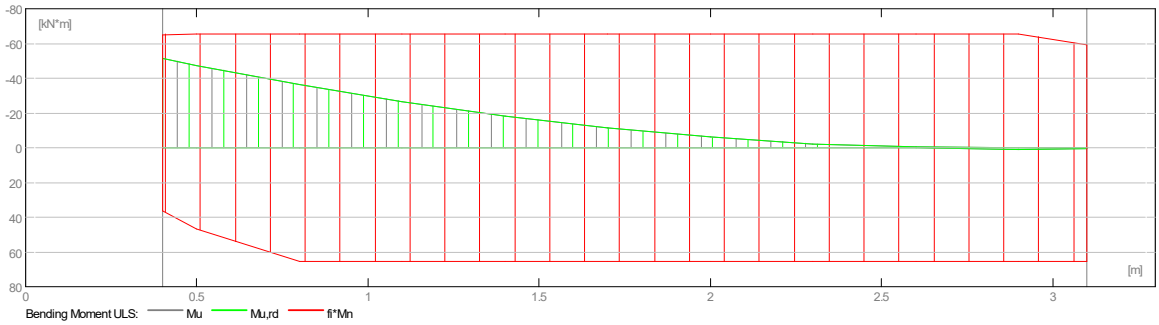
2.3 Calculation options:

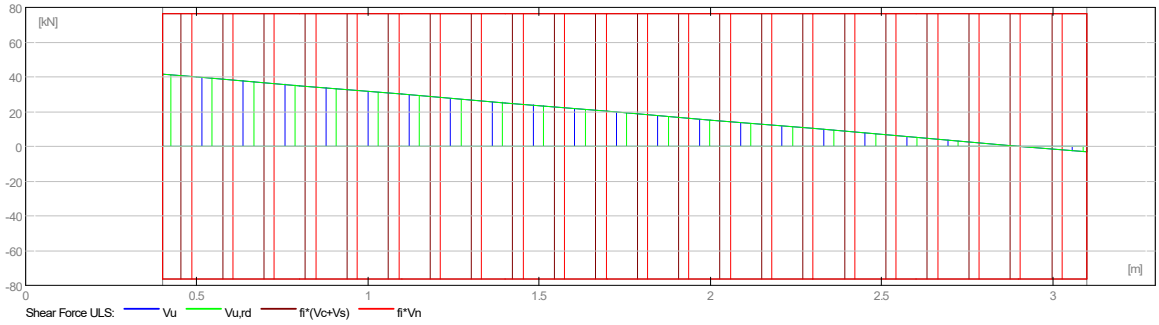
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

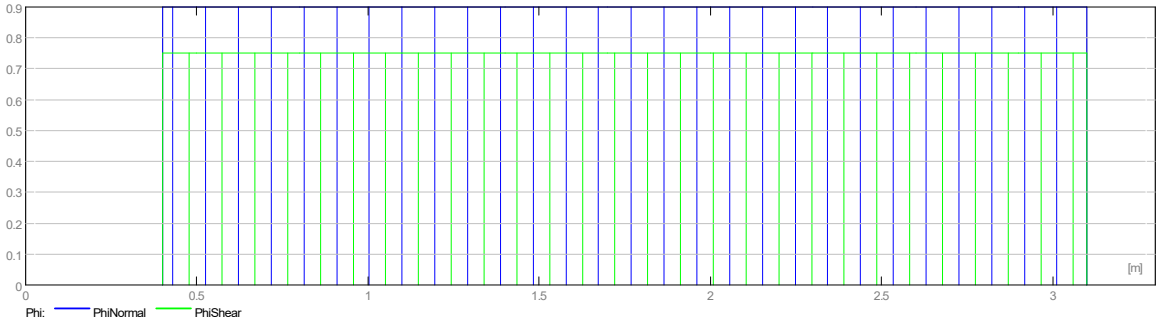
2.4 Calculation results:

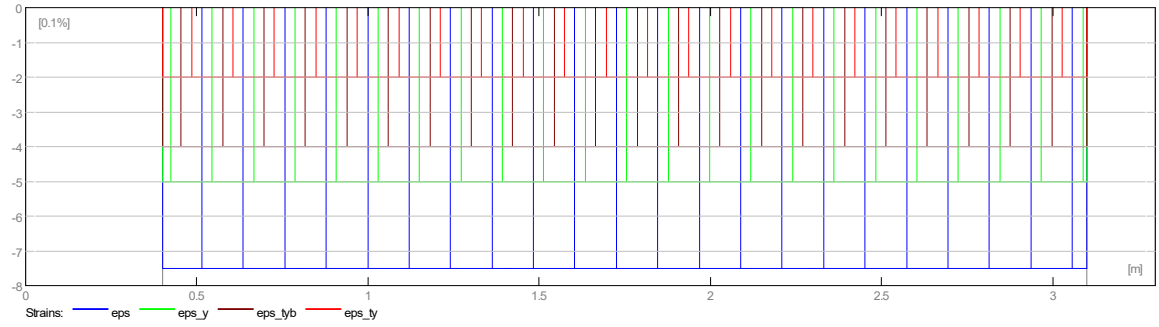
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	0.86	-26.39	-51.65	0.41	41.64	-3.15



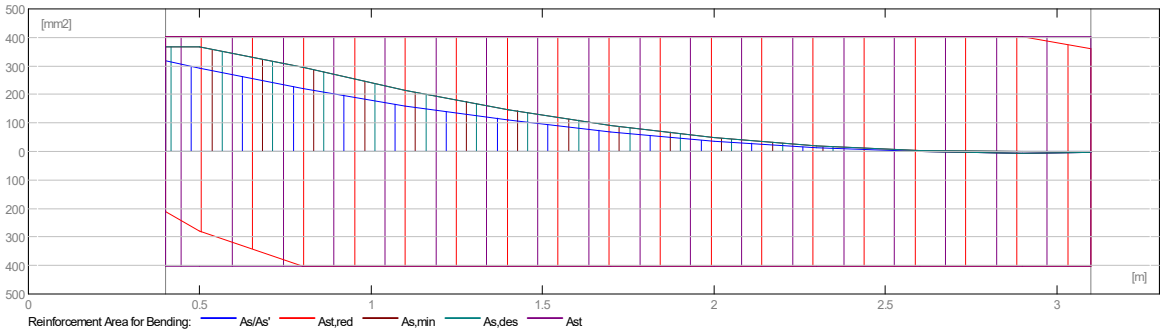


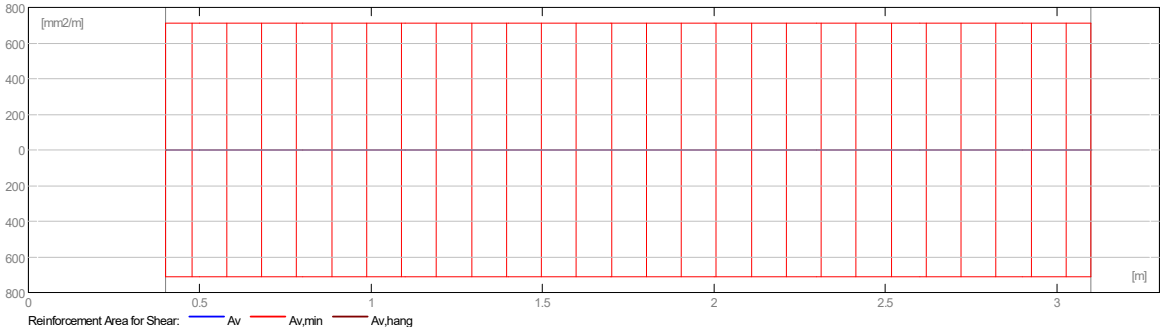




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	5	0	0	318	2	0

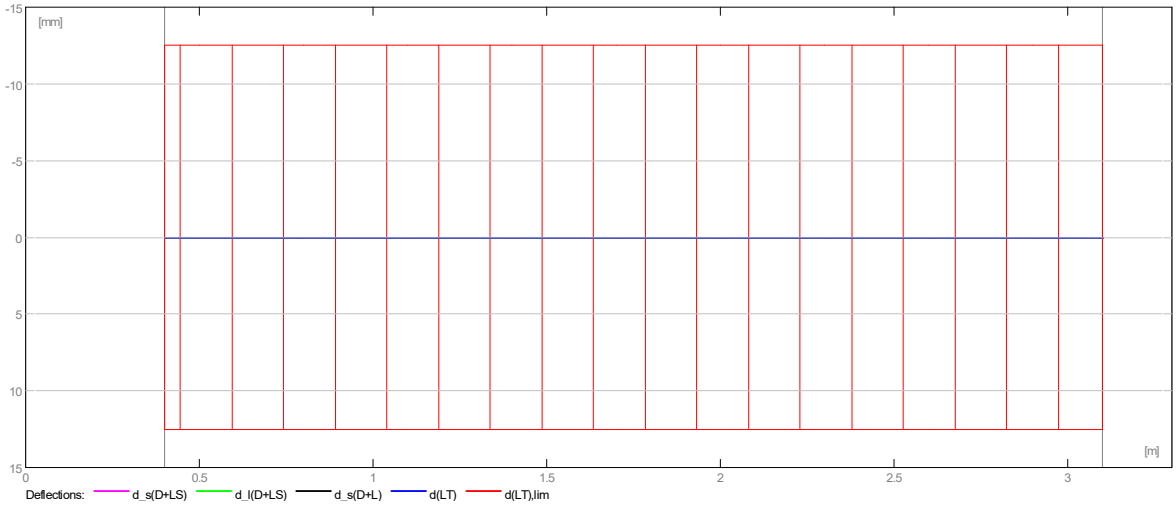




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-12



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.40 to 3.10 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)
0.40	0.00	-51.65	0.00	0.00	0	318
0.50	0.00	-47.40	0.00	0.00	0	291

0.80	0.00	-36.15	0.00	0.00	0	221
1.10	0.00	-26.39	0.00	0.00	0	161
1.40	0.00	-18.13	0.00	0.00	0	110
1.70	0.00	-11.35	0.00	0.00	0	69
2.00	0.00	-6.06	0.00	0.00	0	37
2.30	0.00	-2.26	0.00	0.00	0	14
2.60	0.05	-0.26	0.00	0.00	0	2
2.90	0.86	-0.00	0.00	0.00	5	0
3.10	0.41	-0.07	0.00	0.00	2	0

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.40	41.64	0.00
0.50	39.98	0.00
0.80	35.01	0.00
1.10	30.05	0.00
1.40	25.08	0.00
1.70	20.11	0.00
2.00	15.14	0.00
2.30	10.18	0.00
2.60	5.21	0.00
2.90	0.25	0.00
3.10	-3.15	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.40 to 3.10 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  2 ϕ16 l = 3.38 from 0.10 to 3.26
- support (Grade 420)
  2 ϕ16 l = 3.65 from 0.04 to 3.26

Transversal reinforcement:

- main (Grade 300)
  stirrups 13 ϕ10 l = 1.30
  e = 1*0.03 + 12*0.22 (m)

3 Material survey:

- Concrete volume = 0.41 (m3)
- Formwork = 4.23 (m2)
- Steel Grade 420
  - Total weight = 22.21 (kG)
  - Density = 53.84 (kG/m3)
  - Average diameter = 16.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
16	14.07	22.21

- Steel Grade 300
  - Total weight = 10.39 (kG)
  - Density = 25.18 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	16.84	10.39

1 Level:

- Name : B9 (300 x 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam180 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.70**	**2.55**	**0.20**
	Span length:	L_o = 3.00 (m)			
	Section	from 0.00 to 2.55 (m) 300 x 700 (mm) without left slab without right slab			

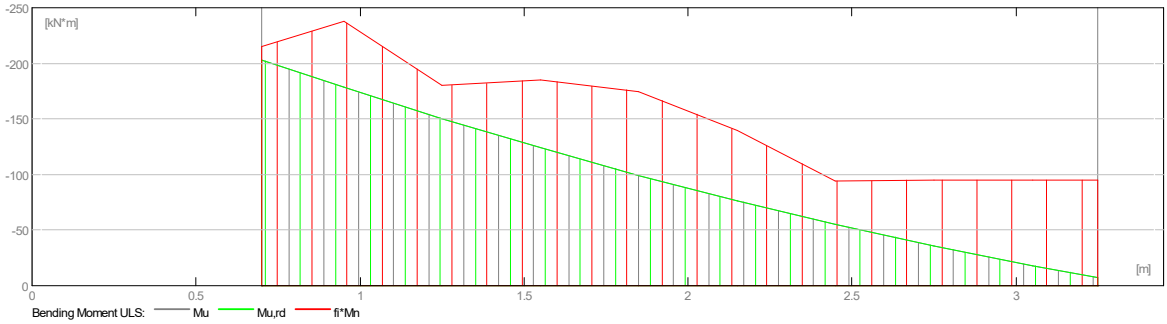
2.3 Calculation options:

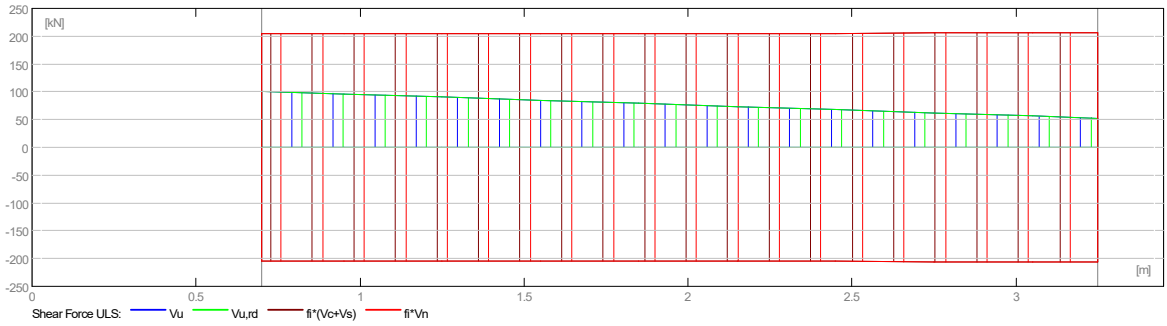
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

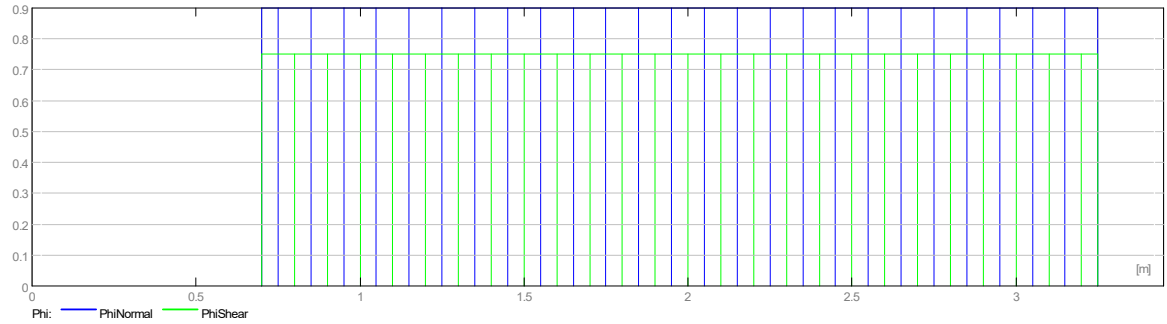
2.4 Calculation results:

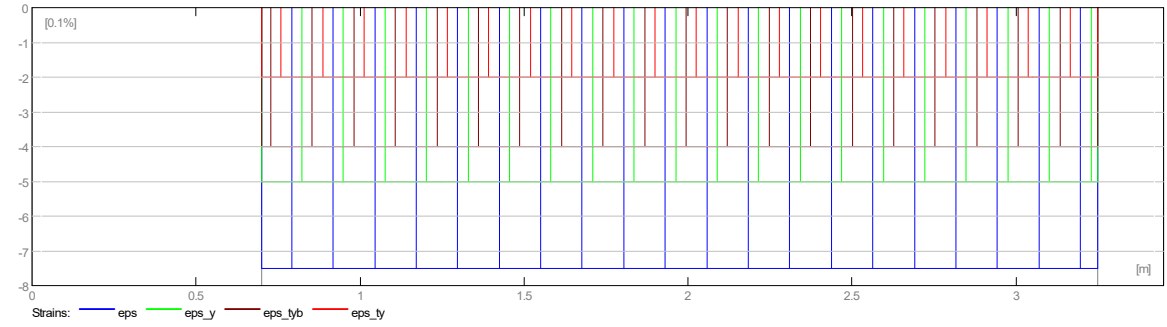
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	0.00	-123.90	-202.93	-7.47	100.91	52.44



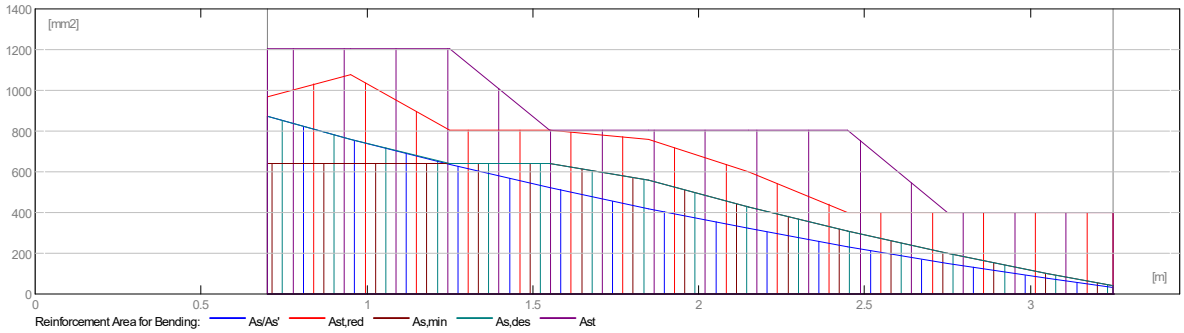


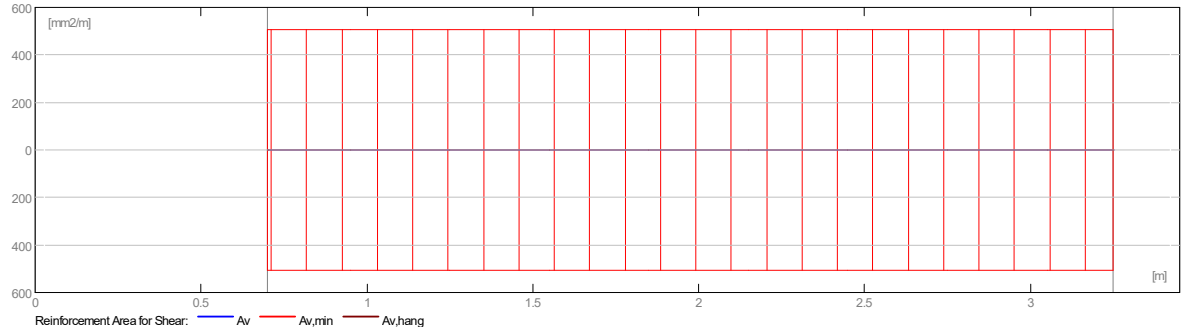




2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top
P1	0	0	0	871	0	31

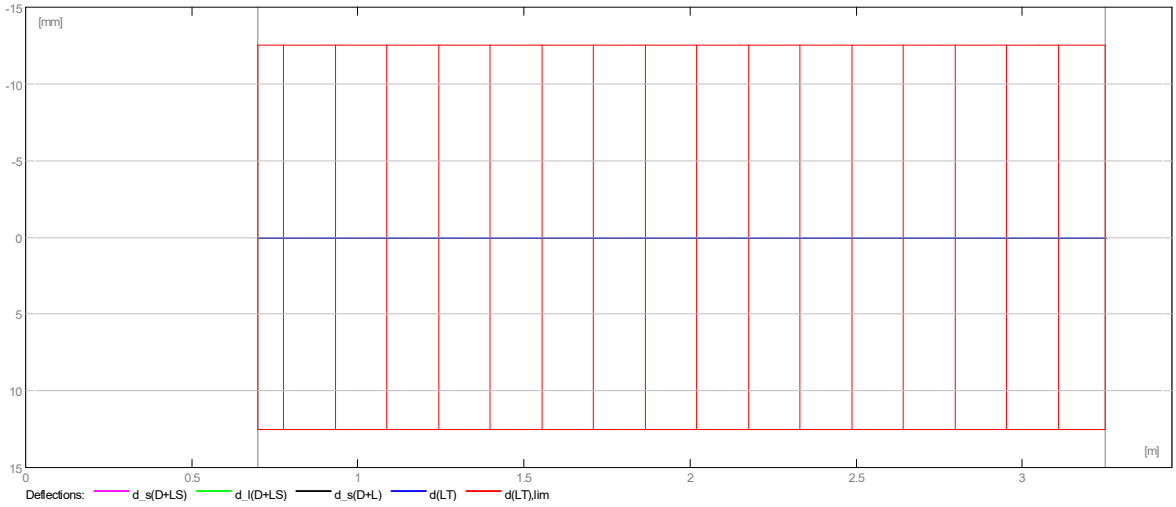




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-13



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.70 to 3.25 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)
0.70	0.00	-202.93	0.00	0.00	0	871
0.95	0.00	-178.17	0.00	0.00	0	761

1.25	0.00	-150.18	0.00	0.00	0	638
1.55	0.00	-123.90	0.00	0.00	0	524
1.85	0.00	-99.32	0.00	0.00	0	418
2.15	0.00	-76.46	0.00	0.00	0	320
2.45	0.00	-55.31	0.00	0.00	0	231
2.75	0.00	-35.87	0.00	0.00	0	149
3.05	0.00	-18.14	0.00	0.00	0	75
3.25	0.00	-7.47	0.00	0.00	0	31

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.70	100.91	0.00
0.95	96.16	0.00
1.25	90.46	0.00
1.55	84.76	0.00
1.85	79.05	0.00
2.15	73.35	0.00
2.45	67.65	0.00
2.75	61.95	0.00
3.05	56.25	0.00
3.25	52.44	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.70 to 3.25 (m)

Longitudinal reinforcement:

- assembling (bottom) (Grade 420)
  2 ϕ16 l = 3.37 from 0.04 to 3.41
- support (Grade 420)
  2 ϕ16 l = 3.59 from 0.04 to 3.41
  2 ϕ16 l = 2.43 from 0.09 to 2.52
  2 ϕ16 l = 1.33 from 0.14 to 1.47

Transversal reinforcement:

- main (Grade 300)
  stirrups 9 ϕ10 l = 1.80
  e = 1*0.04 + 8*0.31 (m)

3 Material survey:

- Concrete volume = 0.72 (m3)
- Formwork = 6.02 (m2)
- Steel Grade 420
  - Total weight = 33.85 (kG)
  - Density = 46.72 (kG/m3)
  - Average diameter = 16.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
16	21.44	33.85

- Steel Grade 300
  - Total weight = 9.97 (kG)
  - Density = 13.76 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	16.16	9.97

1 Level:

- Name : B10 (300 x 700) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Beam: Beam237 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Additional reinforcement: : Grade 300 f_y = 300.00 (MPa)

2.2 Geometry:

Number of identical elements: 1

2.2.1	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P1	**Span**	**0.60**	**3.50**	**0.40**
	Span length:	L_o = 4.00 (m)			
	Section	from 0.00 to 3.50 (m) 300 x 700 (mm) without left slab without right slab			

2.2.2	Span	Position	L.supp. (m)	L (m)	R.supp. (m)
	P2	**Span**	**0.40**	**3.60**	**0.40**
	Span length:	L_o = 4.00 (m)			
	Section	from 0.00 to 3.60 (m) 300 x 700 (mm) without left slab without right slab			

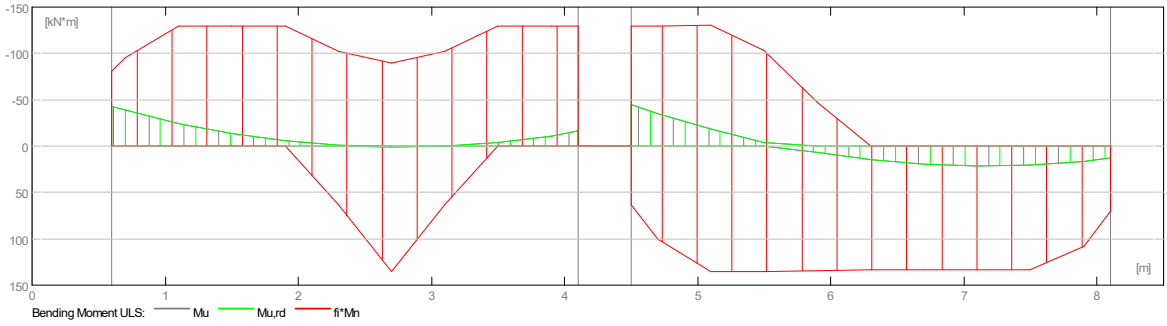
2.3 Calculation options:

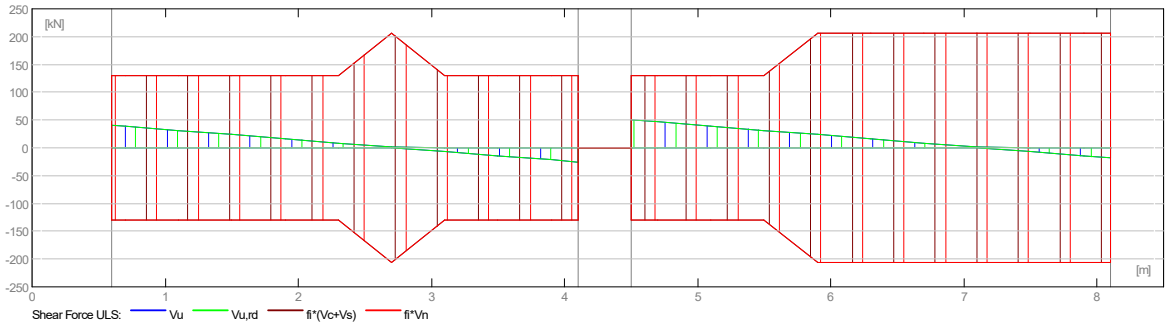
- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : bottom c = 40 (mm)
  : side c1 = 40 (mm)
  : top c2 = 40 (mm)

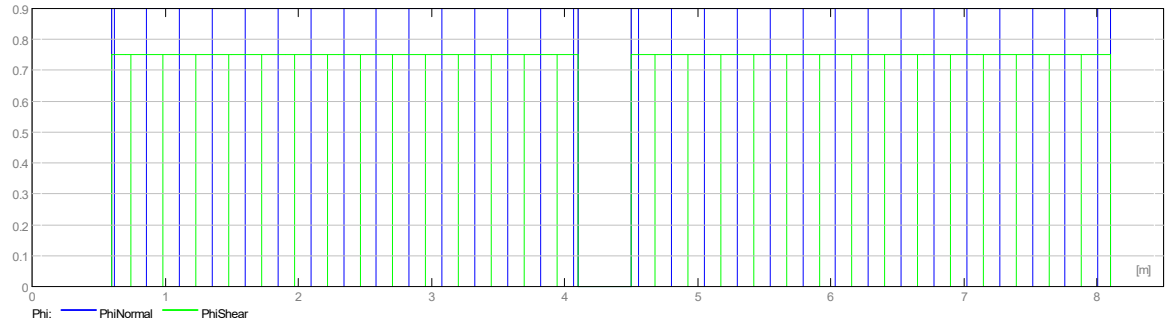
2.4 Calculation results:

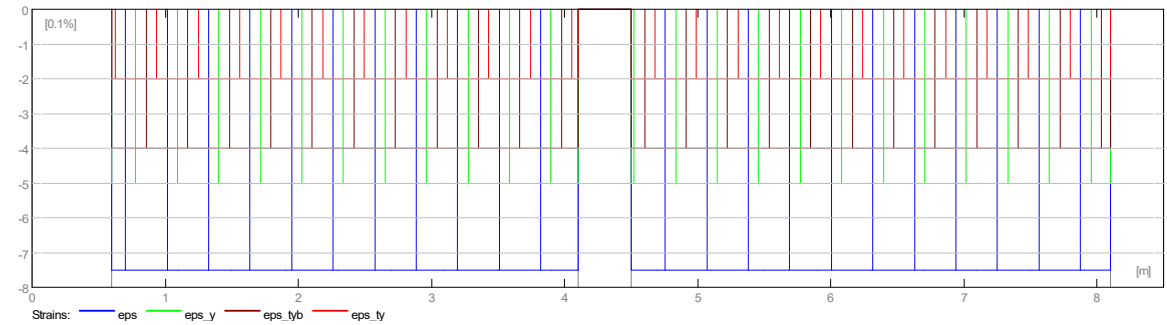
2.4.1 Internal forces in ULS

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)	Vu,r (kN)
P1	1.23	-13.73	-43.20	-16.29	40.98	-25.55
P2	21.51	-4.11	-45.21	12.43	50.23	-18.20





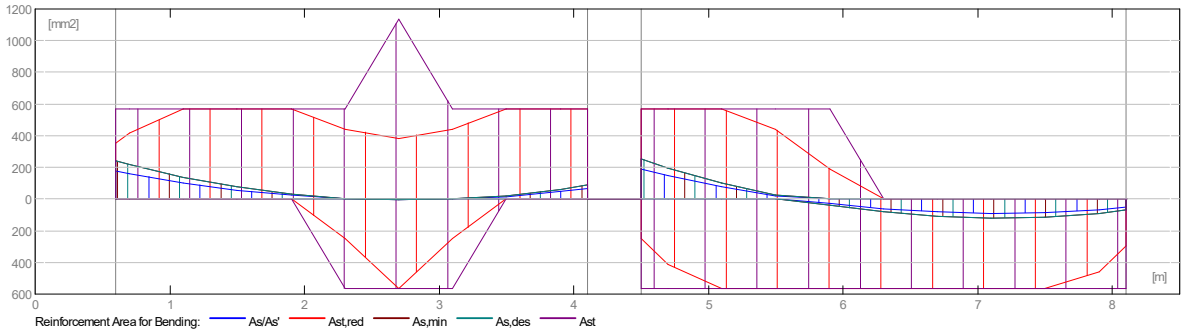


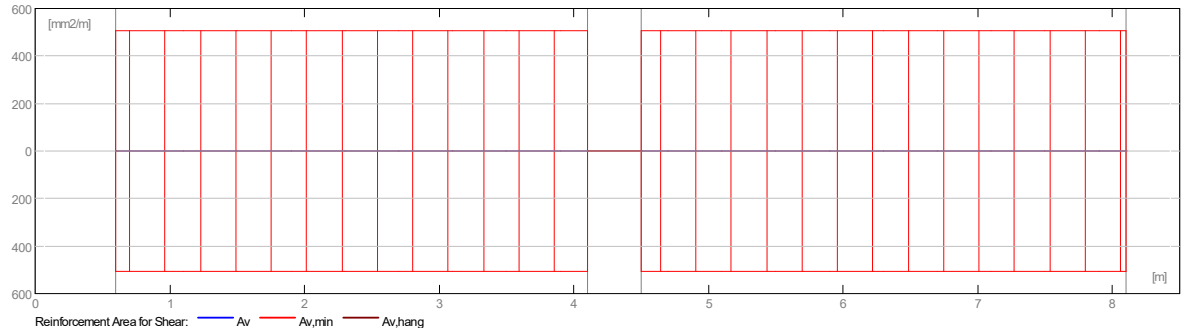


2.4.2 Required reinforcement area

Span	Span (mm2)		Left support (mm2)		Right support (mm2)	
	bottom	top	bottom	top	bottom	top

P1	5	0	0	180	0	68
P2	89	0	0	188	52	0

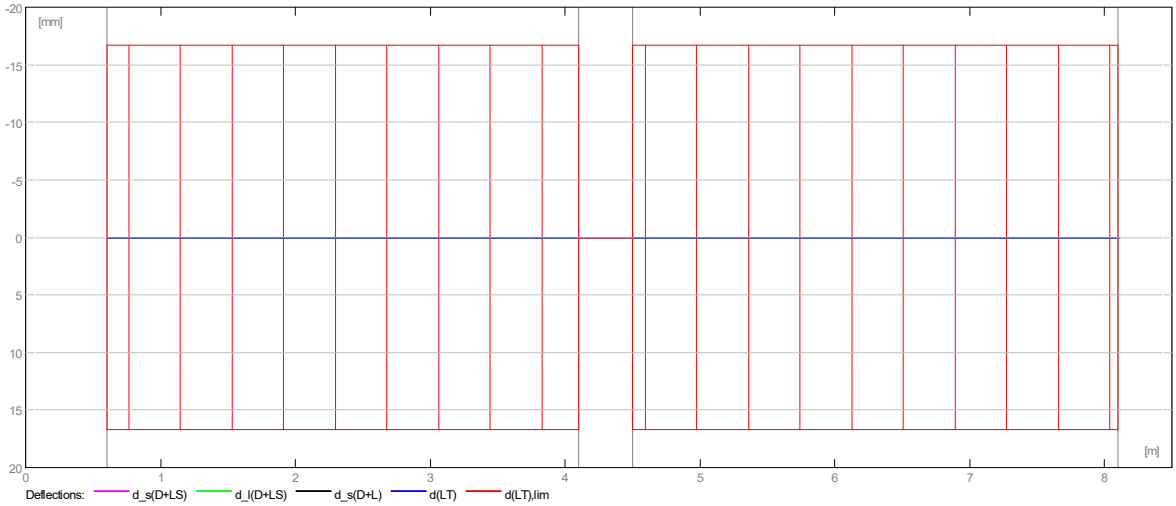




2.4.3 Deflections

d_s(D+LS) - initial due to long-term load deflection
d_l(D+LS) - long-term due to long-term load deflection
d_s(D+L) - initial due to total load deflection
d(LT) - total sustained live-load deflection
d(LT),lim - allowable deflection

Span	d_s(D+LS) (mm)	d_l(D+LS) (mm)	d_s(D+L) (mm)	d(LT) (mm)	d(LT),lim (mm)
P1	0	0	0	0	-17
P2	0	0	0	0	-17



2.5 Theoretical results - detailed results:

2.5.1 P1 : Span from 0.60 to 4.10 (m)

	ULS		SLS			
Abscissa (m)	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)
0.60	0.00	-43.20	0.00	0.00	0	180
0.70	0.00	-38.91	0.00	0.00	0	162

1.10	0.00	-24.80	0.00	0.00	0	103
1.50	0.00	-13.73	0.00	0.00	0	57
1.90	0.00	-5.70	0.00	0.00	0	24
2.30	0.00	-0.71	0.00	0.00	0	3
2.70	1.23	-0.00	0.00	0.00	5	0
3.10	0.14	-0.37	0.00	0.00	1	2
3.50	0.00	-4.00	0.00	0.00	0	17
3.90	0.00	-11.18	0.00	0.00	0	46
4.10	0.00	-16.29	0.00	0.00	0	68

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
0.60	40.98	0.00
0.70	39.08	0.00
1.10	31.48	0.00
1.50	23.87	0.00
1.90	16.27	0.00
2.30	8.67	0.00
2.70	1.06	0.00
3.10	-6.54	0.00
3.50	-14.14	0.00
3.90	-21.75	0.00
4.10	-25.55	0.00

2.5.2 P2 : Span from 4.50 to 8.10 (m)

Abscissa (m)	ULS Mu,max. (kN*m)	Mu,min. (kN*m)	SLS Mu,max. (kN*m)	Mu,min. (kN*m)	As (mm2)	As' (mm2)
4.50	0.00	-45.21	0.00	0.00	0	188
4.70	0.00	-35.16	0.00	0.00	0	146
5.10	0.00	-18.12	0.00	0.00	0	75
5.50	0.00	-4.11	0.00	0.00	0	17
5.90	6.86	-0.00	0.00	0.00	28	0
6.30	14.78	-0.00	0.00	0.00	61	0
6.70	19.67	-0.00	0.00	0.00	82	0
7.10	21.51	-0.00	0.00	0.00	89	0
7.50	20.31	-0.00	0.00	0.00	84	0
7.90	16.07	-0.00	0.00	0.00	67	0
8.10	12.43	-0.00	0.00	0.00	52	0

Abscissa (m)	ULS Vu,max. (kN)	SLS Vu,max. (kN)
4.50	50.23	0.00
4.70	46.42	0.00
5.10	38.82	0.00
5.50	31.22	0.00
5.90	23.61	0.00
6.30	16.01	0.00
6.70	8.41	0.00
7.10	0.87	0.00
7.50	-6.80	0.00
7.90	-14.40	0.00
8.10	-18.20	0.00

2.6 Reinforcement:

2.6.1 P1 : Span from 0.60 to 4.10 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  2 ϕ19 l = 1.41 from 2.00 to 3.40
- assembling (top) (Grade 420)
  2 ϕ19 l = 4.22 from 0.04 to 4.26
- assembling (bottom) (Grade 420)
  2 ϕ19 l = 4.22 from 0.04 to 4.26

- support (Grade 420)
  2 ϕ19 l = 2.96 from 0.04 to 3.00
  2 ϕ19 l = 3.81 from 2.40 to 6.20

Transversal reinforcement:

- main (Grade 300)
  stirrups 12 ϕ10 l = 1.80
  e = 1*0.05 + 11*0.31 (m)

2.6.2 P2 : Span from 4.50 to 8.10 (m)

Longitudinal reinforcement:

- bottom (Grade 420)
  2 ϕ19 l = 4.26 from 4.20 to 8.46
- assembling (top) (Grade 420)
  2 ϕ19 l = 4.12 from 4.34 to 8.46

Transversal reinforcement:

- main (Grade 300)
  stirrups 12 ϕ10 l = 1.80
  e = 1*0.10 + 11*0.31 (m)

3 Material survey:

- Concrete volume = 1.79 (m3)
- Formwork = 14.45 (m2)
- Steel Grade 420
  - Total weight = 111.36 (kG)
  - Density = 62.39 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
19	50.02	111.36

- Steel Grade 300
  - Total weight = 26.58 (kG)
  - Density = 14.89 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Survey according to diameters:

Diameter	Length (m)	Weight (kG)
10	43.09	26.58

1 Level:

- Name : Kolom K1 (700 x 700) mm
- Reference level : 4.20 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column136 OK

ϕ *Sn/U = **3.39 > 1.00**
ϕ *Mn/Mu = **5.61 > 1.00**
ϕ *Pn/Pu = **3.59 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	700 x 700 (mm)
2.2.2	Height: L	= 4.20 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	136	1644.99	-29.76	40.52	12.41	-89.78
	99.95	24.06	1.00				
C2 = 1,2D + 1,6L + 0,5Lr	design	136	2136.99	-46.08	62.29	18.94	
	-149.52	166.88	40.32	1.00			

C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	136	1423.23	-25.47	34.71	10.64
-76.99	85.68	20.61	1.00			

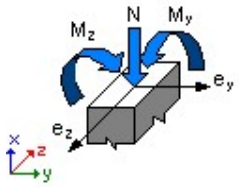
β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (B)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 0.19 - the extreme tensile strain in reinforcement

Internal forces:
N = 2136.99 (kN) My = 62.29 (kN*m) Mz = 166.88 (kN*m)

Design forces:
Lower node
Pu = 2136.99 (kN) Myu = 62.29 (kN*m) Mzu = 166.88 (kN*m) Mu = 178.13 (kN*m) U = 0.23

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **3.39 > 1.00**
ϕ *Mn/Mu = **5.61 > 1.00**
ϕ *Pn/Pu = **3.59 > 1.00**

ϕ *Sn = 0.76
ϕ *Mn = 999.67 (kN*m)
ϕ *Pn = 7661.90 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 46783.46 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 83616.35 (kN*m2) (6.6.4.4.4b)

βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 20008333333 (mm4)
Ise = 321089773 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 20.78 < 40.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -46.08 (kN*m) MB = 62.29 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = 62.29 (kN*m)
Mc = M = 62.29 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = -149.52 (kN*m) MB = 166.88 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = 166.88 (kN*m)
Mc = M = 166.88 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**5671 (mm2)**	**1.157 (%)**
Minimum reinforcement (code requirement):	4900 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	39200 (mm2)	8.000 (%)

Main bars (Grade 420):

- 20 ϕ19 l = 6.20 (m)

Transversal reinforcement (Grade 300):

stirrups:	27 ϕ10	l = 2.56 (m)
	54 ϕ10	l = 1.63 (m)

3 Material survey:

- Concrete volume = 1.72 (m3)
- Formwork = 9.80 (m2)

- Steel Grade 420
  - Total weight = 276.08 (kG)
  - Density = 160.98 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	124.00	276.08

- Steel Grade 300
  - Total weight = 96.75 (kG)

- Density = 56.41 (kG/m3)
- Average diameter = 10.0 (mm)
- Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	156.87	96.75

1 Level:

- Name : Kolom K2 (700 x 700) mm
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column51 OK

ϕ *Sn/U = **3.07 > 1.00**
ϕ *Mn/Mu = **5.41 > 1.00**
ϕ *Pn/Pu = **3.13 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	700 x 700 (mm)
2.2.2	Height: L	= 4.63 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.85 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	51	1901.56	107.50	0.00	64.50	65.09
	0.00	39.05	1.00				

C2 = 1,2D + 1,6L + 0,5Lr	design	51	2446.45	158.06	0.00	94.84
81.79	0.00	49.08	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	51	1641.22	92.13	0.00	55.28
55.80	0.00	33.48	1.00			

β = <0,1> , manually defined sustained axial loads part

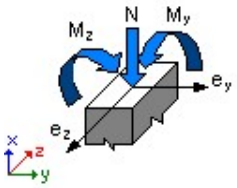
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 0.14 - the extreme tensile strain in reinforcement

Internal forces:
N = 2446.45 (kN) My = 158.06 (kN*m) Mz = 81.79 (kN*m)

Design forces:
Upper node
Pu = 2446.45 (kN) Myu = 158.06 (kN*m) Mzu = 81.79 (kN*m) Mu = 177.97 (kN*m) U = 0.26

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **3.07 > 1.00**
ϕ *Mn/Mu = **5.41 > 1.00**
ϕ *Pn/Pu = **3.13 > 1.00**

ϕ *Sn = 0.79
ϕ *Mn = 962.39 (kN*m)
ϕ *Pn = 7661.90 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 46783.46 (kN) (6.6.4.4.2)

k*lu = 4.20 (m)
EI = 83616.35 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 20008333333 (mm4)
Ise = 321089773 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 20.78 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = 158.06 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 158.06 (kN*m)
Mc = M = 158.06 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 81.79 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 81.79 (kN*m)
Mc = M = 81.79 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**5671 (mm2)**	**1.157 (%)**
Minimum reinforcement (code requirement):	4900 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	39200 (mm2)	8.000 (%)

Main bars (Grade 420):
- 20 ϕ19 l = 6.63 (m)

Transversal reinforcement (Grade 300):

stirrups:	30 ϕ10	l = 2.56 (m)
	60 ϕ10	l = 1.63 (m)

3 Material survey:

- Concrete volume = 1.85 (m3)
- Formwork = 10.57 (m2)

- Steel Grade 420
  - Total weight = 295.01 (kG)
  - Density = 159.48 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	132.50	295.01

- Steel Grade 300
  - Total weight = 107.50 (kG)
  - Density = 58.11 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	174.30	107.50

1 Level:

- Name : K3 (700 x 700) mm
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column119 OK

ϕ *Sn/U = **3.40 > 1.00**
ϕ *Mn/Mu = **23.77 > 1.00**
ϕ *Pn/Pu = **3.40 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	700 x 700 (mm)
2.2.2	Height: L	= 4.55 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
			(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
	(kN*m)	(kN*m)					
C1 = 1,4D	design	119	1752.82	-31.45	0.00	-18.87	0.13
	0.00	0.08	1.00				
C2 = 1,2D + 1,6L + 0,5Lr		design	119	2253.46	-47.90	0.00	-28.74

	0.36	0.00	0.22	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	119	1502.63	-26.95	0.00	-16.17
	0.10	0.00	0.06	1.00			

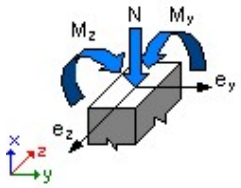
β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 0.00 - the extreme tensile strain in reinforcement

Internal forces:
N = 2253.46 (kN) My = -47.90 (kN*m) Mz = 0.36 (kN*m)

Design forces:
Upper node
Pu = 2253.46 (kN) Myu = -47.90 (kN*m) Mzu = 0.36 (kN*m) Mu = 47.91 (kN*m) U = 0.24

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **3.40 > 1.00**
ϕ *Mn/Mu = **23.77 > 1.00**
ϕ *Pn/Pu = **3.40 > 1.00**

ϕ *Sn = 0.80
ϕ *Mn = 1138.88 (kN*m)
ϕ *Pn = 7661.90 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 46783.46 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 83616.35 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)

Es = 200000.00 (MPa)
Ig = 20008333333 (mm4)
Ise = 321089773 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 20.78 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -47.90 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = -47.90 (kN*m)
Mc = M = -47.90 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 0.36 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 0.36 (kN*m)
Mc = M = 0.36 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**5671 (mm2)**	**1.157 (%)**
Minimum reinforcement (code requirement):	4900 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	39200 (mm2)	8.000 (%)

Main bars (Grade 420):

- 20 ϕ19 l = 6.55 (m)

Transversal reinforcement (Grade 300):

stirrups:	22 ϕ10	l = 2.56 (m)
	44 ϕ10	l = 1.63 (m)

3 Material survey:

- Concrete volume = 1.89 (m3)
- Formwork = 10.78 (m2)
- Steel Grade 420
  - Total weight = 291.67 (kG)
  - Density = 154.61 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	131.00	291.67

- Steel Grade 300
  - Total weight = 78.83 (kG)
  - Density = 41.79 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	127.82	78.83

1 Level:

- Name : K4 (700 x 700) mm
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column103 OK

ϕ *Sn/U = **3.38 > 1.00**
ϕ *Mn/Mu = **39.13 > 1.00**
ϕ *Pn/Pu = **3.38 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	700 x 700 (mm)
2.2.2	Height: L	= 4.55 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	103	1763.52	-17.20	0.00	-10.32	4.44
	0.00	2.66	1.00				
C2 = 1,2D + 1,6L + 0,5Lr		design	103	2269.38	-26.15	0.00	-15.69

	6.10	0.00	3.66	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	103	1511.88	-14.74	0.00	-8.84	
	3.82	0.00	2.29	1.00			

β = <0,1> , manually defined sustained axial loads part

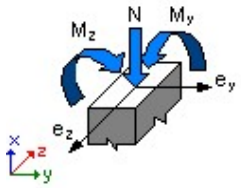
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)
Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 0.00 - the extreme tensile strain in reinforcement

Internal forces:
N = 2269.38 (kN) My = -26.15 (kN*m) Mz = 6.10 (kN*m)

Design forces:
Upper node
Pu = 2269.38 (kN) Myu = -26.15 (kN*m) Mzu = 6.10 (kN*m) Mu = 26.85 (kN*m) U = 0.24

Safety factors:
U, Mu, Pu - required strength
ϕ *Sn/U = **3.38 > 1.00**
ϕ *Mn/Mu = **39.13 > 1.00**
ϕ *Pn/Pu = **3.38 > 1.00**

ϕ *Sn = 0.80
ϕ *Mn = 1050.78 (kN*m)
ϕ *Pn = 7661.90 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 46783.46 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 83616.35 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 20008333333 (mm4)

Ise = 321089773 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 20.78 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -26.15 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = -26.15 (kN*m)
Mc = M = -26.15 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 6.10 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 6.10 (kN*m)
Mc = M = 6.10 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**5671 (mm2)**	**1.157 (%)**
Minimum reinforcement (code requirement):	4900 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	39200 (mm2)	8.000 (%)

Main bars (Grade 420):

- 20 ϕ19 l = 6.55 (m)

Transversal reinforcement (Grade 300):

stirrups:	30 ϕ10	l = 2.56 (m)
	60 ϕ10	l = 1.63 (m)

3 Material survey:

- Concrete volume = 1.89 (m3)
- Formwork = 10.78 (m2)
- Steel Grade 420
  - Total weight = 291.67 (kG)
  - Density = 154.61 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	131.00	291.67

- Steel Grade 300
  - Total weight = 107.50 (kG)
  - Density = 56.98 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	174.30	107.50

1 Level:

- Name : K5 (600 x 600)
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column143 OK

ϕ *Sn/U = **4.41 > 1.00**
ϕ *Mn/Mu = **14.38 > 1.00**
ϕ *Pn/Pu = **4.41 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	600 x 600 (mm)
2.2.2	Height: L	= 4.55 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	143	1021.39	-25.87	0.00	-15.52	5.63
	0.00	3.38	1.00				
C2 = 1,2D + 1,6L + 0,5Lr	design	143	1240.30	-39.27	0.00	-23.56	
	8.92	0.00	5.35	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	143	895.34	-22.20	0.00	-13.32	
	4.79	0.00	2.88	1.00			

β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

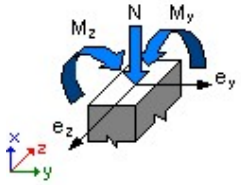
2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

Reinforcement percentage = 0.95% is less than 1.00%

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
εc (*1000) = -3.00 - strain in concrete
εt (*1000) = 0.00 - the extreme tensile strain in reinforcement

Internal forces:
N = 1240.30 (kN) My = -39.27 (kN*m) Mz = 8.92 (kN*m)

Design forces:
Upper node
Pu = 1240.30 (kN) Myu = -39.27 (kN*m) Mzu = 8.92 (kN*m) Mu = 40.27 (kN*m) U = 0.18

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **4.41 > 1.00**
ϕ *Mn/Mu = **14.38 > 1.00**
ϕ *Pn/Pu = **4.41 > 1.00**

ϕ *Sn = 0.78
ϕ *Mn = 579.16 (kN*m)
ϕ *Pn = 5472.30 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 23091.72 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 41271.96 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 10800000000 (mm4)

Ise = 134695651 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 24.25 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -39.27 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = -39.27 (kN*m)
Mc = M = -39.27 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 8.92 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 8.92 (kN*m)
Mc = M = 8.92 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**3402 (mm2)**	**0.945 (%)**
Minimum reinforcement (code requirement):	3600 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	28800 (mm2)	8.000 (%)

Main bars (Grade 420):

- 12 ϕ19 l = 4.51 (m)

Transversal reinforcement (Grade 300):

stirrups:	30 ϕ10	l = 2.16 (m)
	60 ϕ10	l = 1.52 (m)

3 Material survey:

- Concrete volume = 1.39 (m3)
- Formwork = 9.24 (m2)
- Steel Grade 420
  - Total weight = 120.50 (kG)
  - Density = 86.94 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	54.12	120.50

- Steel Grade 300
  - Total weight = 95.96 (kG)
  - Density = 69.24 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	155.59	95.96

1 Level:

- Name : K6 (400 x 700) mm
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column155 OK

ϕ *Sn/U = **3.29 > 1.00**
ϕ *Mn/Mu = **35.97 > 1.00**
ϕ *Pn/Pu = **3.29 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	400 x 700 (mm)
2.2.2	Height: L	= 4.55 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	155	992.76	7.06	0.00	4.23	2.81
	0.00	1.69	1.00				
C2 = 1,2D + 1,6L + 0,5Lr	design	155	1340.77	12.71	0.00	7.63	
	4.27	0.00	2.56	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	155	851.85	6.05	0.00	3.63	
	2.41	0.00	1.44	1.00			

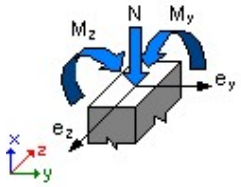
β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
εc (*1000) = -3.00 - strain in concrete
εt (*1000) = 0.00 - the extreme tensile strain in reinforcement

Internal forces:
N = 1340.77 (kN) My = 12.71 (kN*m) Mz = 4.27 (kN*m)

Design forces:
Upper node
Pu = 1340.77 (kN) Myu = 12.71 (kN*m) Mzu = 4.27 (kN*m) Mu = 13.41 (kN*m) U = 0.25

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **3.29 > 1.00**
ϕ *Mn/Mu = **35.97 > 1.00**
ϕ *Pn/Pu = **3.29 > 1.00**

ϕ *Sn = 0.81
ϕ *Mn = 482.40 (kN*m)
ϕ *Pn = 4411.50 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 27516.10 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 49179.68 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 11433333333 (mm4)
Ise = 197468913 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 20.78 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = 12.71 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 12.71 (kN*m)
Mc = M = 12.71 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 4.27 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 4.27 (kN*m)
Mc = M = 4.27 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**3402 (mm2)**	**1.215 (%)**
Minimum reinforcement (code requirement):	2800 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	22400 (mm2)	8.000 (%)

Main bars (Grade 420):

- 12 ϕ19 l = 4.51 (m)

Transversal reinforcement (Grade 300):

stirrups:	30 ϕ10	l = 1.96 (m)
	30 ϕ10	l = 1.58 (m)
	30 ϕ10	l = 1.18 (m)

3 Material survey:

- Concrete volume = 1.08 (m3)
- Formwork = 8.47 (m2)
- Steel Grade 420
  - Total weight = 120.50 (kG)
  - Density = 111.78 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	54.12	120.50

- Steel Grade 300
  - Total weight = 87.33 (kG)
  - Density = 81.01 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	141.59	87.33

1 Level:

- Name : Kolom K7 (dia 600) mm
- Reference level : 0.00 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column991 OK

ϕ *Sn/U = **2.16 > 1.00**
ϕ *Mn/Mu = **2.30 > 1.00**
ϕ *Pn/Pu = **4.38 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	C	
	Diameter	= 600 (mm)
2.2.2	Height: L	= 4.60 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.80 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature MzB (kN*m)	Group MzC (kN*m)	N β (kN)	MyA (kN*m)	MyB (kN*m)	MyC (kN*m)	MzA (kN*m)
C1 = 1,4D	design 0.00	991 21.45	788.27 1.00	-122.34	0.00	-73.40	35.75

C2 = 1,2D + 1,6L + 0,5Lr	design	991	989.06	-169.96	0.00	-101.97
51.14	0.00	30.69	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	991	675.71	-104.88	0.00	-62.93
30.64	0.00	18.38	1.00			

β = <0,1> , manually defined sustained axial loads part

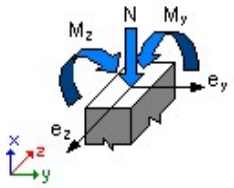
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (A)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 1.94 - the extreme tensile strain in reinforcement

Internal forces:
N = 989.06 (kN) My = -169.96 (kN*m) Mz = 51.14 (kN*m)

Design forces:
Upper node
Pu = 989.06 (kN) Myu = -169.96 (kN*m) Mzu = 51.14 (kN*m) Mu = 177.48 (kN*m) U = 0.19

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **2.16 > 1.00**
ϕ *Mn/Mu = **2.30 > 1.00**
ϕ *Pn/Pu = **4.38 > 1.00**

ϕ *Sn = 0.41
ϕ *Mn = 407.80 (kN*m)
ϕ *Pn = 4331.43 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 13750.67 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 24576.65 (kN*m2) (6.6.4.4.4b)

βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 6361725124 (mm4)
Ise = 81996865 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 28.00 < 34.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -169.96 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = -169.96 (kN*m)
Mc = M = -169.96 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 51.14 (kN*m) MB = 0.00 (kN*m)
Case: Cross-section at the column end (Upper node), Slenderness not taken into account
M = 51.14 (kN*m)
Mc = M = 51.14 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**2835 (mm2)**	**1.009 (%)**
Minimum reinforcement (code requirement):	2827 (mm2)	1.006 (%)
Maximum reinforcement (code requirement):	22474 (mm2)	8.000 (%)

Main bars (Grade 420):

- 10 ϕ19 l = 6.60 (m)

Transversal reinforcement (Grade 300):

stirrups: 30 ϕ10 l = 1.76 (m)

3 Material survey:

- Concrete volume = 1.07 (m3)
- Formwork = 7.16 (m2)

- Steel Grade 420
  - Total weight = 146.95 (kG)
  - Density = 136.77 (kG/m3)
  - Average diameter = 19.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
19	66.00	146.95

- Steel Grade 300
  - Total weight = 32.61 (kG)
  - Density = 30.35 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	52.87	32.61

1 Level:

- Name : K8 (400 x 400) mm
- Reference level : 4.20 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column517 OK

ϕ *Sn/U = **2.12 > 1.00**
ϕ *Mn/Mu = **1.75 > 1.00**
ϕ *Pn/Pu = **13.08 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 300 f_y = 300.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	400 x 400 (mm)
2.2.2	Height: L	= 4.20 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	517	140.69	-45.49	53.08	13.65	8.39
	3.64	6.49	1.00				
C2 = 1,2D + 1,6L + 0,5Lr	design	517	188.50	-64.51	75.74	19.64	
	11.22	7.22	9.62	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	517	120.63	-38.94	45.46	11.70	

7.20	3.12	5.56	1.00

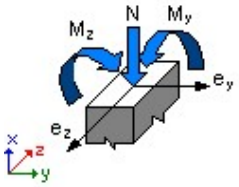
β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (B)

Section classification: Tension-controlled
ϕ = 0.90 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 6.69 - the extreme tensile strain in reinforcement

Internal forces:
N = 188.50 (kN) My = 75.74 (kN*m) Mz = 7.22 (kN*m)

Design forces:
Lower node
Pu = 188.50 (kN) Myu = 75.74 (kN*m) Mzu = 7.22 (kN*m) Mu = 76.09 (kN*m) U = 0.06

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **2.12 > 1.00**
ϕ *Mn/Mu = **1.75 > 1.00**
ϕ *Pn/Pu = **13.08 > 1.00**

ϕ *Sn = 0.13
ϕ *Mn = 133.23 (kN*m)
ϕ *Pn = 2466.37 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 4871.06 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 8706.07 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)

Ig = 2133333333 (mm4)
Ise = 32142386 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 36.37 < 40.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = -64.51 (kN*m) MB = 75.74 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = 75.74 (kN*m)
Mc = M = 75.74 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = 11.22 (kN*m) MB = 7.22 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = 7.22 (kN*m)
Mc = M = 7.22 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**2413 (mm2)**	**1.508 (%)**
Minimum reinforcement (code requirement):	1600 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	12800 (mm2)	8.000 (%)

Main bars (Grade 300):

- 12 ϕ16 l = 6.20 (m)

Transversal reinforcement (Grade 300):

stirrups:	27 ϕ10	l = 1.36 (m)
	54 ϕ10	l = 0.98 (m)

3 Material survey:

- Concrete volume = 0.56 (m3)
- Formwork = 5.60 (m2)

- Steel Grade 300
  - Total weight = 172.62 (kG)
  - Density = 308.24 (kG/m3)
  - Average diameter = 12.7 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	89.42	55.15
16	74.40	117.47

1 Level:

- Name : KL (250 x 400) mm
- Reference level : 4.20 (m)
- Fire rating : 0 (h)
- Environment class : F0

2 Column: Column806 OK

ϕ *Sn/U = **2.99 > 1.00**
ϕ *Mn/Mu = **2.87 > 1.00**
ϕ *Pn/Pu = **4.55 > 1.00**

U, Mu, Pu - required strength

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
  Unit weight : 2447.32 (kG/m3)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)
- Transversal reinforcement : Grade 300 f_y = 300.00 (MPa)
- β_1 : 0.84
  β_1 = a/c, factor relating depth of equivalent rectangular compressive stress block a to depth of neutral axis c
  β_1 = <0,65-0,85>

2.2 Geometry:

Number of identical elements: 1

2.2.1	Rectangular	250 x 400 (mm)
2.2.2	Height: L	= 4.20 (m)
2.2.3	Slab thickness	= 0.00 (m)
2.2.4	Beam height	= 0.70 (m)
2.2.5	Cover	= 40 (mm)

2.3 Calculation options:

- Calculations according to : ACI 318M-19
- Slenderness taken into account : Y
- Non-sway structure : Y
- Ties : to slab
- Story number (counted from top to bottom) : n = 1
- Seismic design category : SDC A

2.4 Loads:

Case	Nature	Group	N	MyA	MyB	MyC	MzA
	MzB	MzC	β				
	(kN*m)	(kN*m)	(kN)	(kN*m)	(kN*m)	(kN*m)	(kN*m)
C1 = 1,4D	design	806	274.13	16.04	-16.29	-3.36	-7.05
	7.68	1.79	1.00				
C2 = 1,2D + 1,6L + 0,5Lr	design	806	340.94	23.13	-23.46	-4.82	
	-10.59	11.53	2.68	1.00			
C3 = 1,2D +1,6Lr/R +(1L+0,5W)	design	806	240.06	13.69	-13.92	-2.87	
	-6.04	6.57	1.53	1.00			

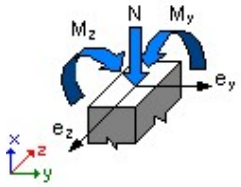
β = <0,1> , manually defined sustained axial loads part
βdns, ratio for reduction of columns stiffness due to sustained axial loads

2.5 Combination list

C1 = 1,4D
C2 = 1,2D + 1,6L + 0,5Lr
C3 = 1,2D +1,6Lr/R +(1L+0,5W)

2.6 Calculation results:

2.6.1 ULS Analysis



Design combination: C2 = 1,2D + 1,6L + 0,5Lr (B)

Section classification: Compression-controlled
ϕ = 0.65 - strength reduction factor, ϕ=<0,65-0,90>
ε_c (*1000) = -3.00 - strain in concrete
ε_t (*1000) = 0.80 - the extreme tensile strain in reinforcement

Internal forces:
N = 340.94 (kN) My = -23.46 (kN*m) Mz = 11.53 (kN*m)

Design forces:
Lower node
Pu = 340.94 (kN) Myu = -23.46 (kN*m) Mzu = 11.53 (kN*m) Mu = 26.14 (kN*m) U = 0.18

Safety factors:
U, Mu, Pu - required strength

ϕ *Sn/U = **2.99 > 1.00**
ϕ *Mn/Mu = **2.87 > 1.00**
ϕ *Pn/Pu = **4.55 > 1.00**

ϕ *Sn = 0.53
ϕ *Mn = 75.14 (kN*m)
ϕ *Pn = 1551.80 (kN)

2.6.1.1 Detailed analysis-Direction Y:

2.6.1.1.1 Critical force

Pc = 2598.69 (kN) (6.6.4.4.2)
k*lu = 4.20 (m)
EI = 4644.66 (kN*m2) (6.6.4.4.4b)
βdns = 1.00
Ec = 25742.96 (MPa)
Es = 200000.00 (MPa)
Ig = 1333333333 (mm4)

Ise = 12122621 (mm4)

2.6.1.1.2 Slenderness analysis

Non-sway structure

l_u (m)	k	$k*l_u$ (m)
4.20	1.00	4.20

k*luy/ry = 36.37 < 40.00 Short column (6.2.5b)(6.2.5c)

2.6.1.1.3 Buckling analysis

MA = 23.13 (kN*m) MB = -23.46 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = -23.46 (kN*m)
Mc = M = -23.46 (kN*m)

2.6.1.2 Detailed analysis-Direction Z:

MA = -10.59 (kN*m) MB = 11.53 (kN*m)
Case: Cross-section at the column end (Lower node), Slenderness not taken into account
M = 11.53 (kN*m)
Mc = M = 11.53 (kN*m)

2.7 Reinforcement:

Reinforcement area:	**1100 (mm2)**	**1.100 (%)**
Minimum reinforcement (code requirement):	1000 (mm2)	1.000 (%)
Maximum reinforcement (code requirement):	8000 (mm2)	8.000 (%)

Main bars (Grade 420):

- 14 ϕ10 l = 4.16 (m)

Transversal reinforcement (Grade 300):

stirrups:	26 ϕ10	l = 1.06 (m)
	26 ϕ10	l = 0.59 (m)

3 Material survey:

- Concrete volume = 0.35 (m3)
- Formwork = 4.55 (m2)
- Steel Grade 420
  - Total weight = 35.92 (kG)
  - Density = 102.63 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	58.24	35.92

- Steel Grade 300
  - Total weight = 26.44 (kG)
  - Density = 75.54 (kG/m3)
  - Average diameter = 10.0 (mm)
  - Reinforcement survey:

Diameter	Length (m)	Weight (kG)
10	42.87	26.44

1 Level:

- Name : Pelat A1 (150) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Plate: Plate 01 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)

2.3 Calculation options:

- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : Cc 30 (mm)
- Thick : 150 (mm)

2.4 Calculation results:

2.4.1 Internal forces

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)
	15.087	-37.358	-37.358	15.087	12.44

2.5 Reinforcement:

2.5.1 A1 : Span from 0.00 to 4.00 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.075 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.225 l = 8.40 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.225 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.225 l = 5.08 (field) (Grade 420)

2.5.2 A1 : Span from 0.00 to 8.00 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.060 l = 1.66 (focus)(Grade 420)
  ϕ19 - 0.240 l = 4.33 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.240 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.120 l = 0.95 (field) (Grade 420)

3 Material survey:

- Concrete volume = 4.80 (m3)
- Formwork = 32.00 (m2)
- Steel Grade 420
  Diameter = 10 (mm)

1 Level:

- Name : Pelat A2 (150) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Plate: Plate 01 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)

2.3 Calculation options:

- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : Cc 30 (mm)
- Thick : 150 (mm)

2.4 Calculation results:

2.4.1 Internal forces

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)
	18.430	-45.637	-45.637	18.430	12.44

2.5 Reinforcement:

2.5.1 A1 : Span from 0.00 to 4.00 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.060 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.240 l = 9.20 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.240 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.160 l = 5.88 (field) (Grade 420)

2.5.2 A1 : Span from 0.00 to 8.80 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.050 l = 1.66 (focus)(Grade 420)
  ϕ19 - 0.250 l = 4.33 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.250 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.100 l = 0.95 (field) (Grade 420)

3 Material survey:

- Concrete volume = 5.28 (m3)
- Formwork = 35.2 (m2)
- Steel Grade 420
  Diameter = 10 (mm)

1 Level:

- Name : Pelat A4 (150) mm
- Reference level : ---
- Environment class : F0
- Fire rating : 0 (h)

2 Plate: Plate 01 OK

2.1 Material properties:

- Concrete : CONCR Fc30 $f_{c'}$ = 30.00 (MPa)
- Longitudinal reinforcement : Grade 420 f_y = 420.00 (MPa)

2.3 Calculation options:

- Regulation of combinations : ACI 318-14/19
- Calculations according to : ACI 318M-19
- Axial force taken into account : no
- Torsion taken into account : no
- Shear force reduction near support taken into account : no
- Seismic design category : SDC A
- Cover : Cc 30 (mm)
- Thick : 150 (mm)

2.4 Calculation results:

2.4.1 Internal forces

Span	Mu,max. (kN*m)	Mu,min. (kN*m)	Mu,l (kN*m)	Mu,r (kN*m)	Vu,l (kN)
	18.430	-45.637	-45.637	18.430	12.44

2.5 Reinforcement:

2.5.1 A1 : Span from 0.00 to 4.00 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.075 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.225 l = 8.40 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.225 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.200 l = 5.08 (field) (Grade 420)

2.5.2 A1 : Span from 0.00 to 8.00 (m)

- assembling (top) (Grade 420)
  ϕ10 - 0.065 l = 1.66 (focus)(Grade 420)
  ϕ19 - 0.260 l = 4.33 (field) (Grade 420)

- assembling (bottom) (Grade 420)
  ϕ10 - 0.260 l = 1.66 (focus)(Grade 420)
  ϕ10 - 0.130 l = 0.95 (field) (Grade 420)

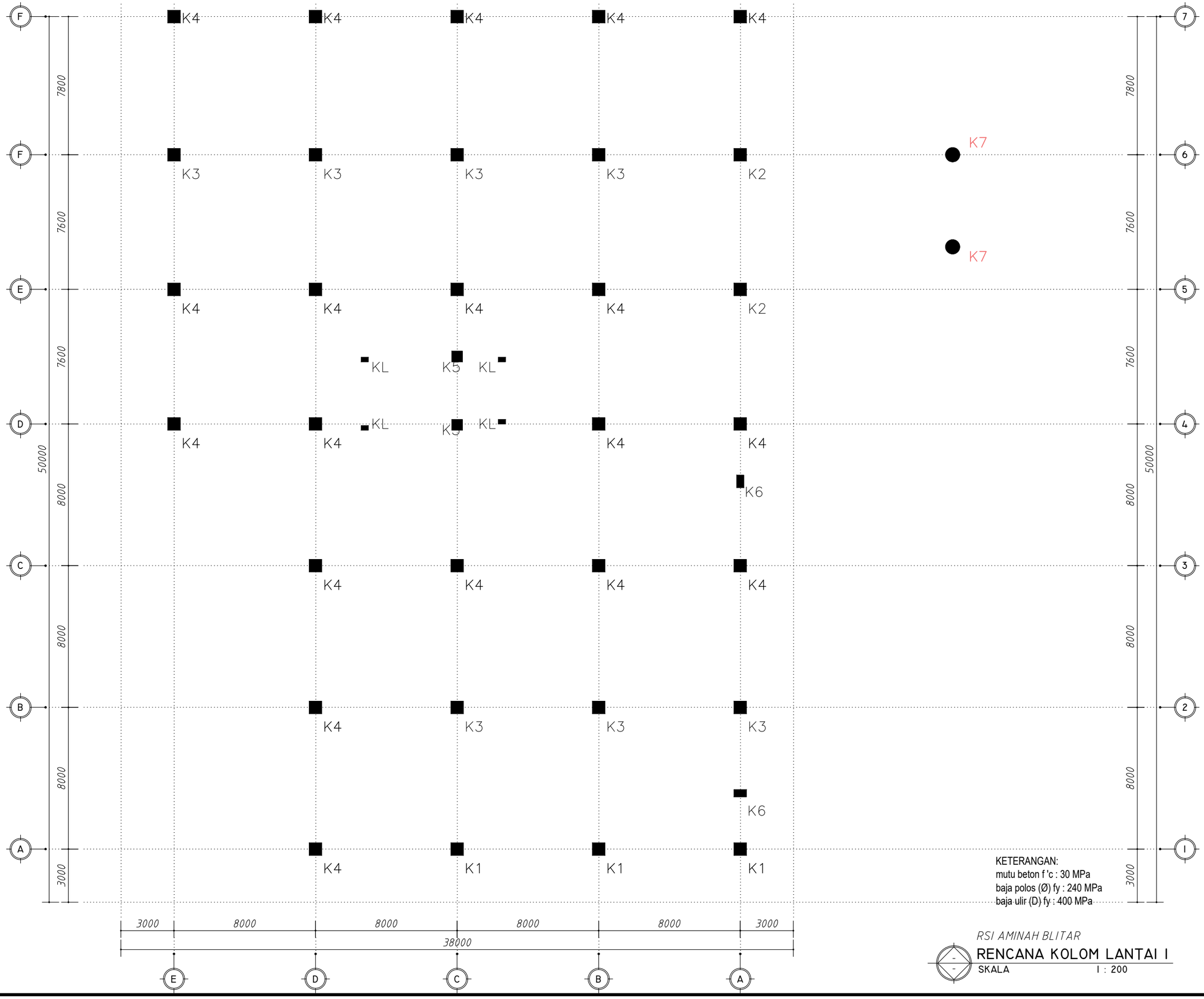
3 Material survey:

- Concrete volume = 3.60 (m3)
- Formwork = 24.00 (m2)
- Steel Grade 420
  Diameter = 10 (mm)

GAMBAR PERENCANAAN
PEMBANGUNAN GEDUNG
RS ISLAM AMINAH BLITAR
(STRUKTURAL)

KONSULTAN PERENCANA

feroz arcadia



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA KOLOM LANTAI I

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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ARSITEK :

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PERENCANA STRUKTUR :

Eko Sulistiyatmojo, S.T

PERENCANA ME :

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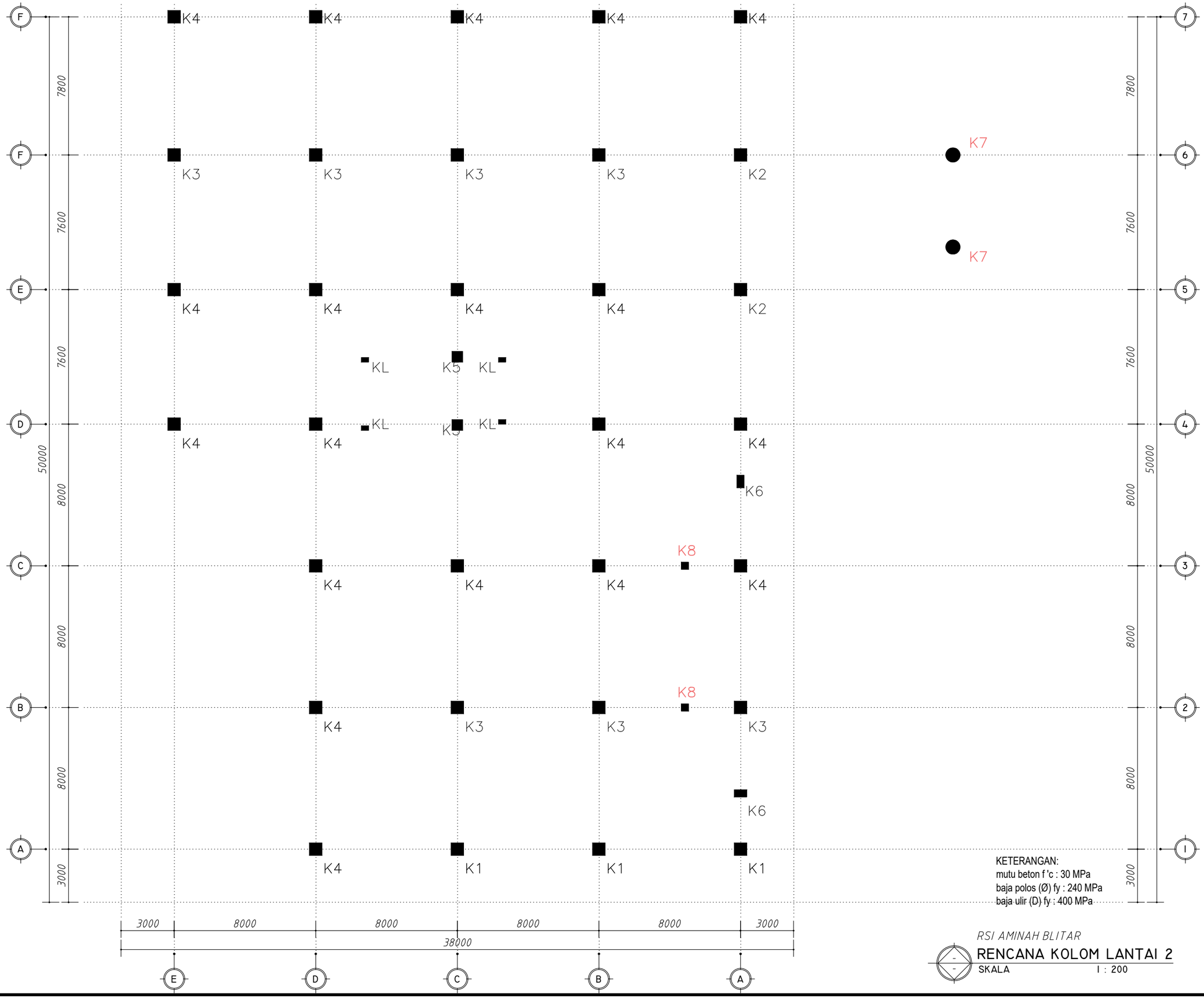
No. Reg. F 1997 01640 2023 0107172 ME 05

HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA KOLOM LANTAI I		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR02-001	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA KOLOM LANTAI 2

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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PERENCANA ME :

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TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA KOLOM LANTAI 2		
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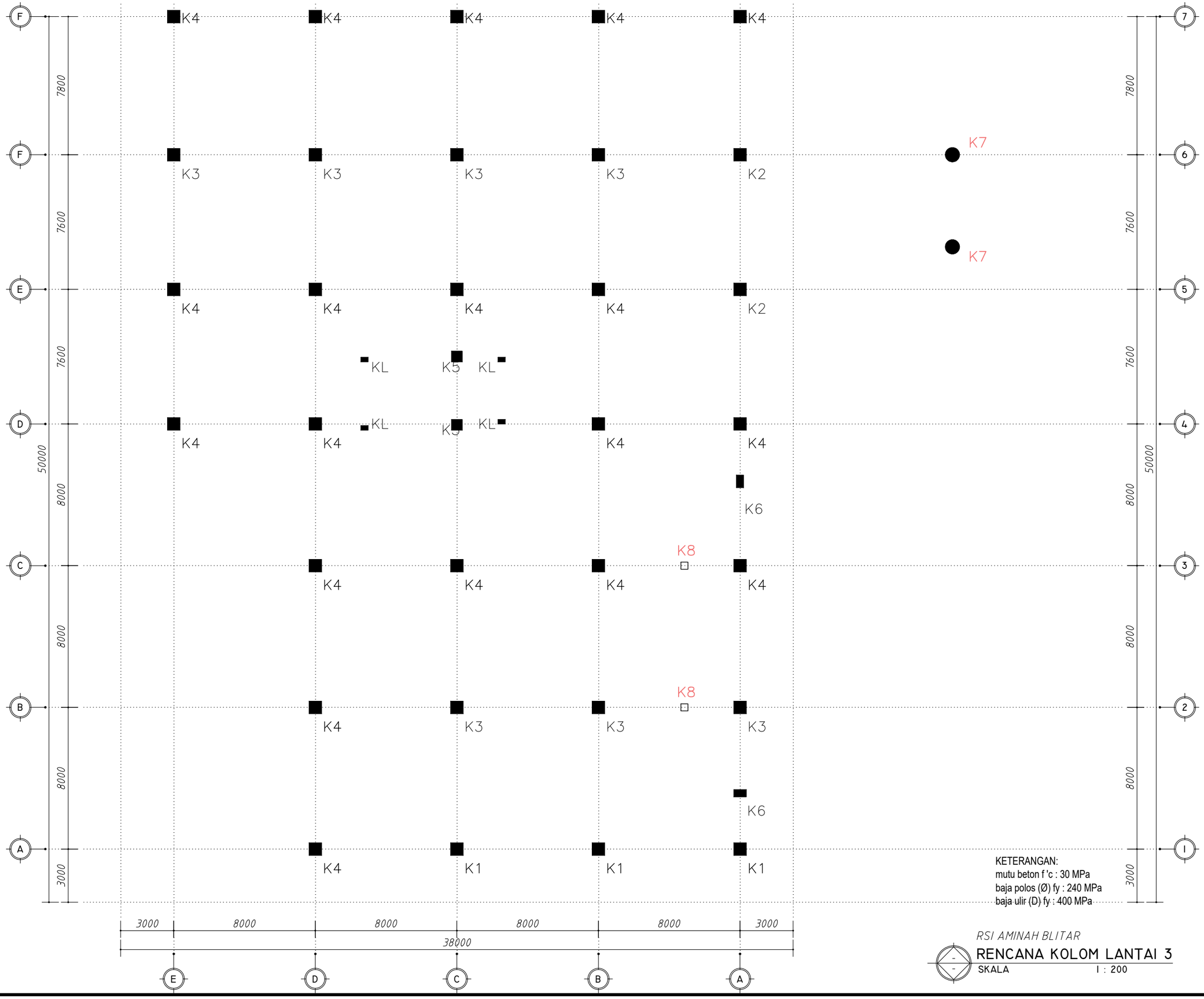
KODE	NO. GAMBAR	JML LEMBAR
STR	STR02-002	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR
RENCANA KOLOM LANTAI 3
SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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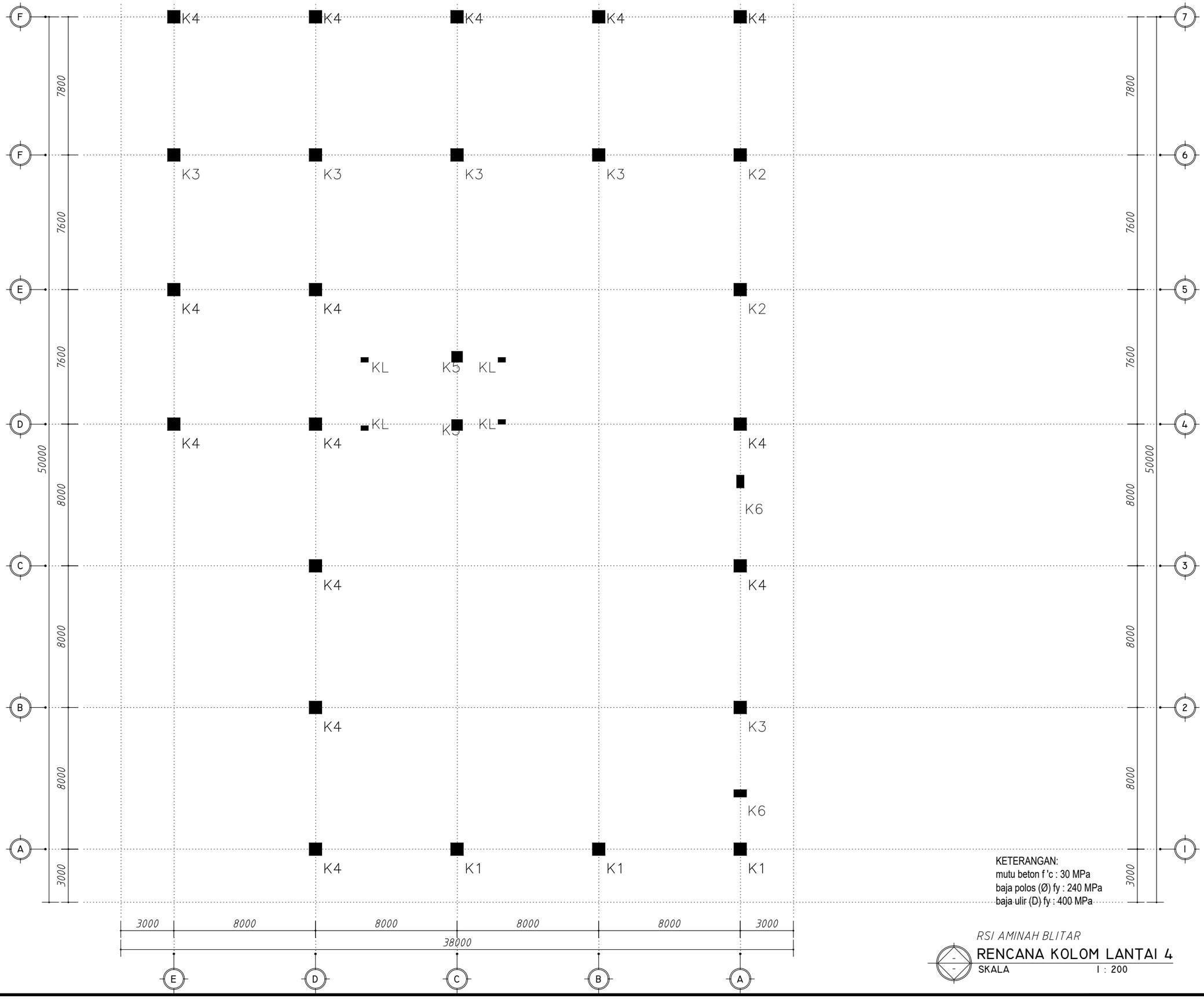
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA KOLOM LANTAI 3		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR02-003	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA KOLOM LANTAI 4

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA KOLOM LANTAI 4		
SKALA	1: 200	
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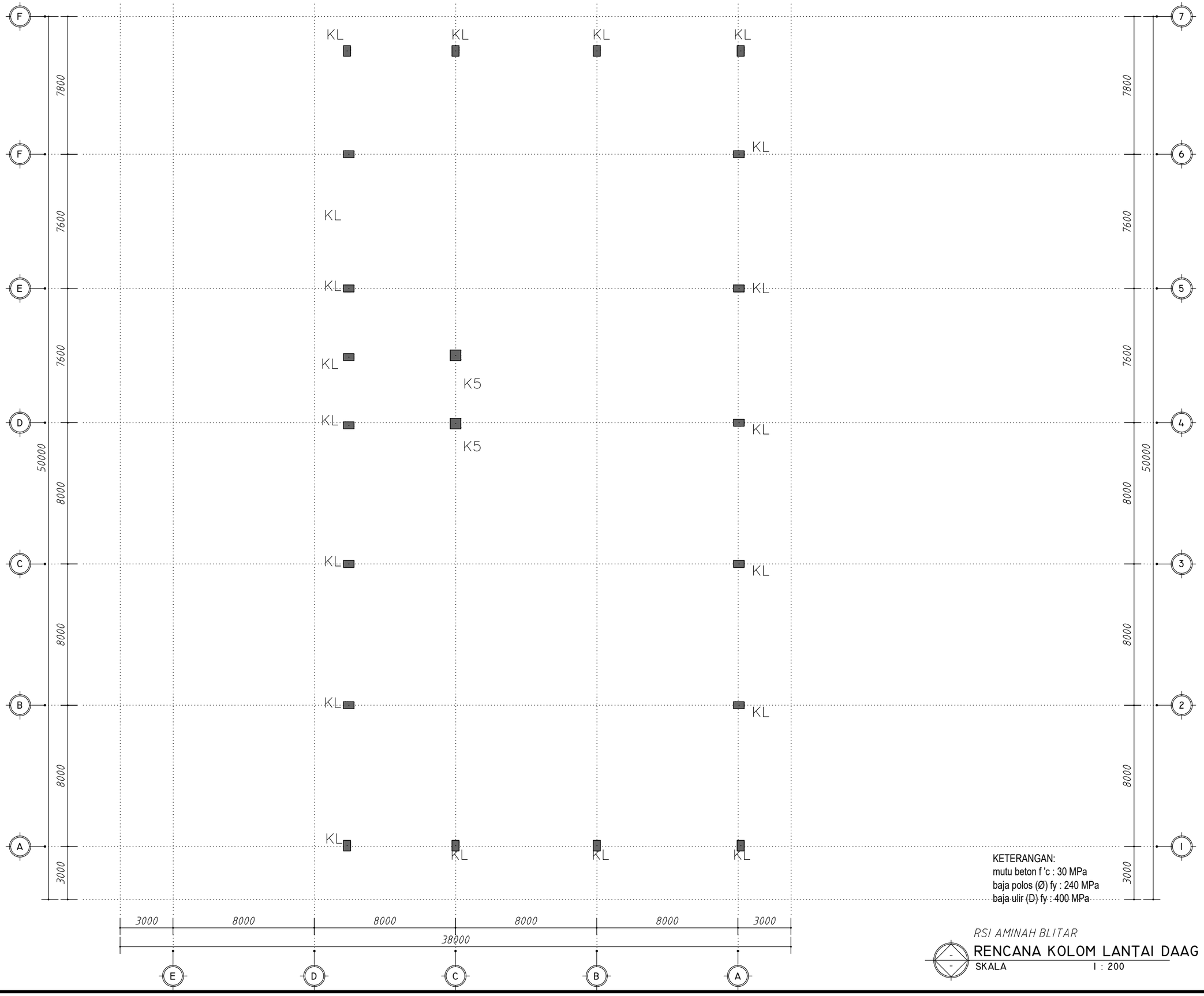
STR	STR02-004	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA KOLOM LANTAI DAAG

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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SKA IAI : 1.1.100.2.02.09.045314

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No. Reg. F 1997 01640 2023 0107172 ME 05

HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023	
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RENCANA KOLOM LANTAI 5		
SKALA	1: 200	
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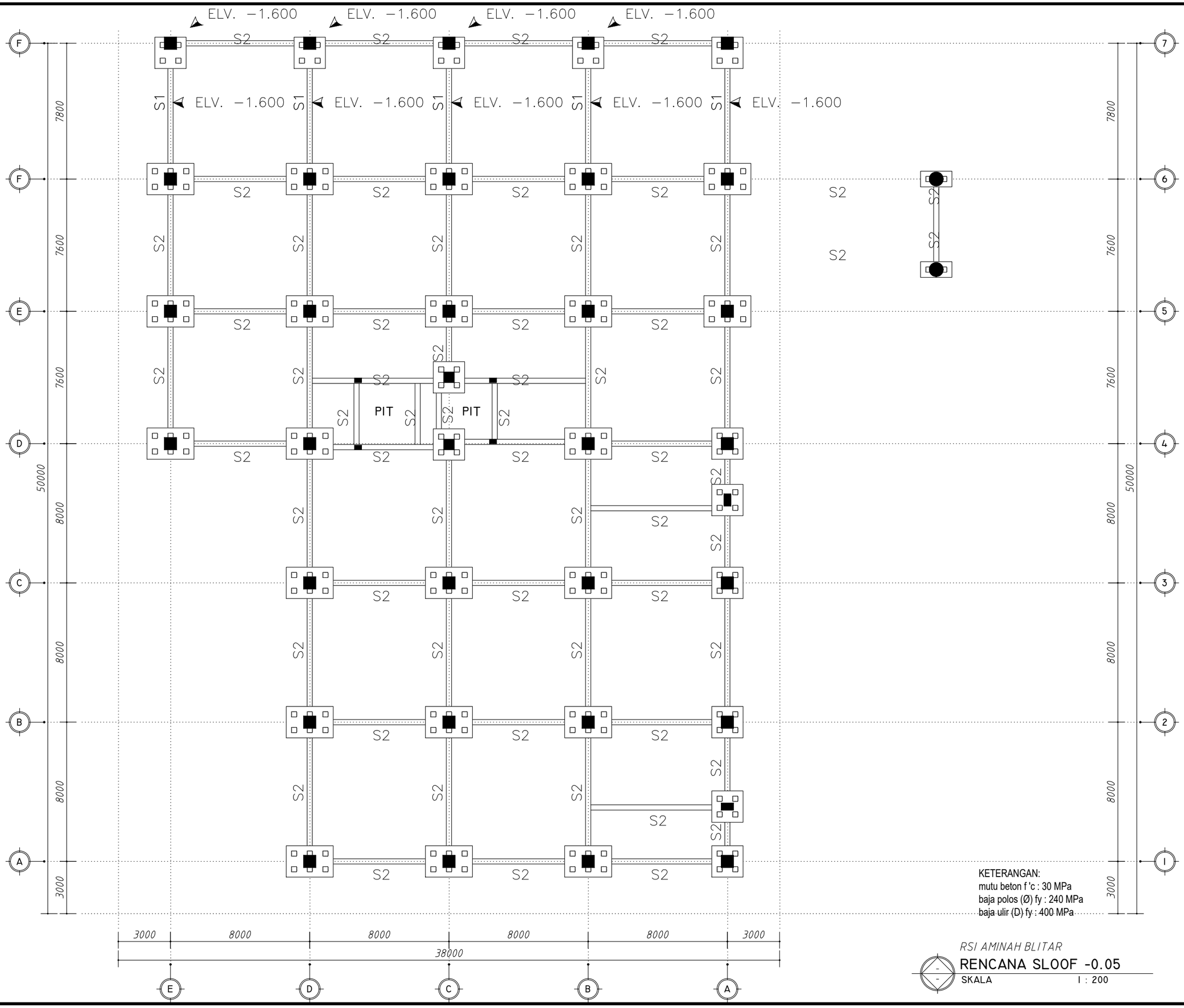

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA SLOOF -0.05

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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SKA IAI : 1.1.100.2.02.09.045314

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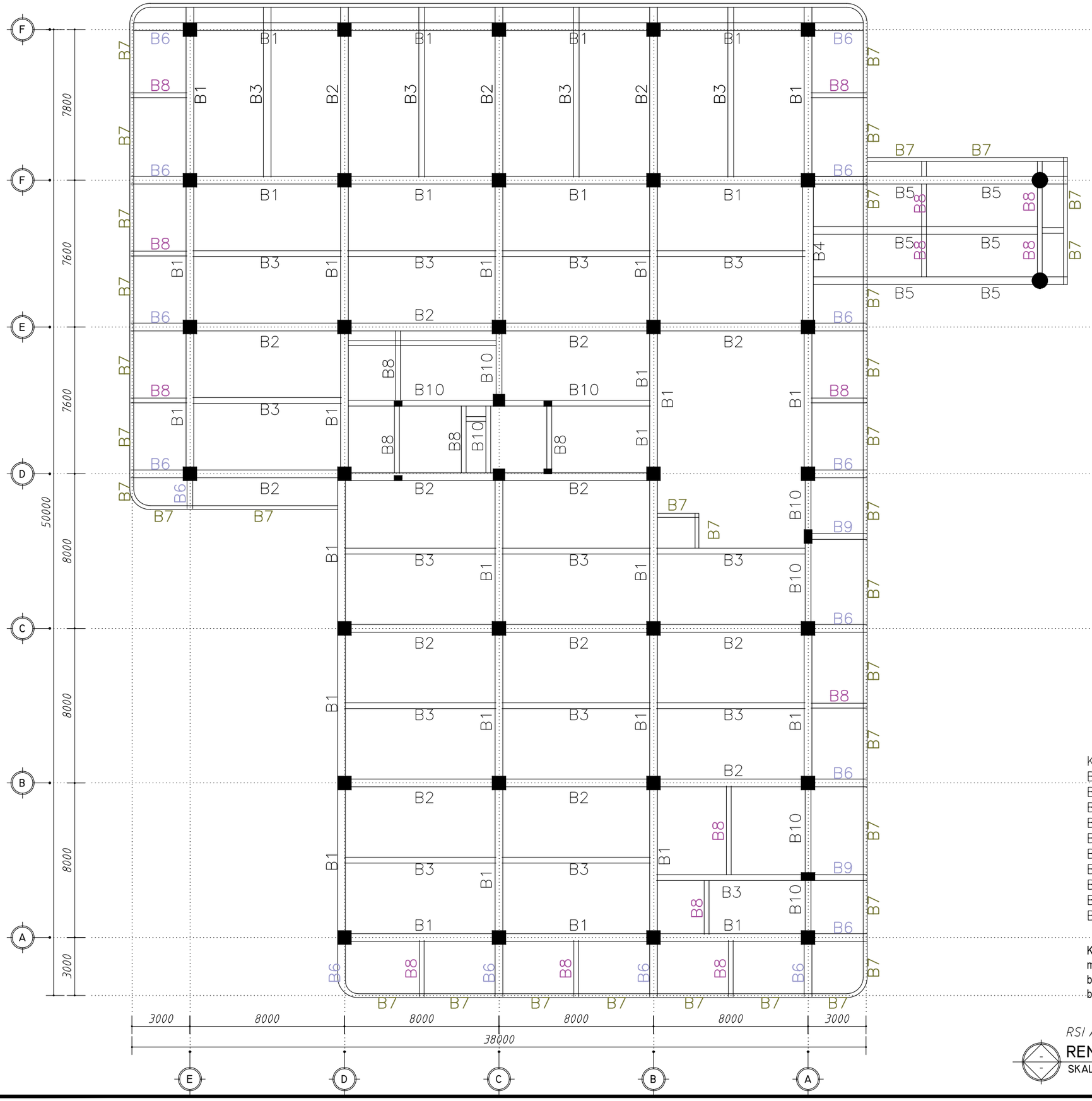
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA SLOOF -0.05 -		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR03-001	-



KETERANGAN :
BALOK B1 400x700
BALOK B2 400x700
BALOK B3 300x700
BALOK B4 550x850
BALOK B5 400x800
BALOK B6 400x700
BALOK B7 200x700
BALOK B8 250x500
BALOK B9 300x700
BALOK B10 300x700

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA BALOK +4.15

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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MENGETAHUI

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MENGETAHUI

Ketua PDM Kabupaten Blitar

Sigit Prasetyo, SE
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ARSITEK :

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SKA IAI : 1.1.100.2.02.09.045314

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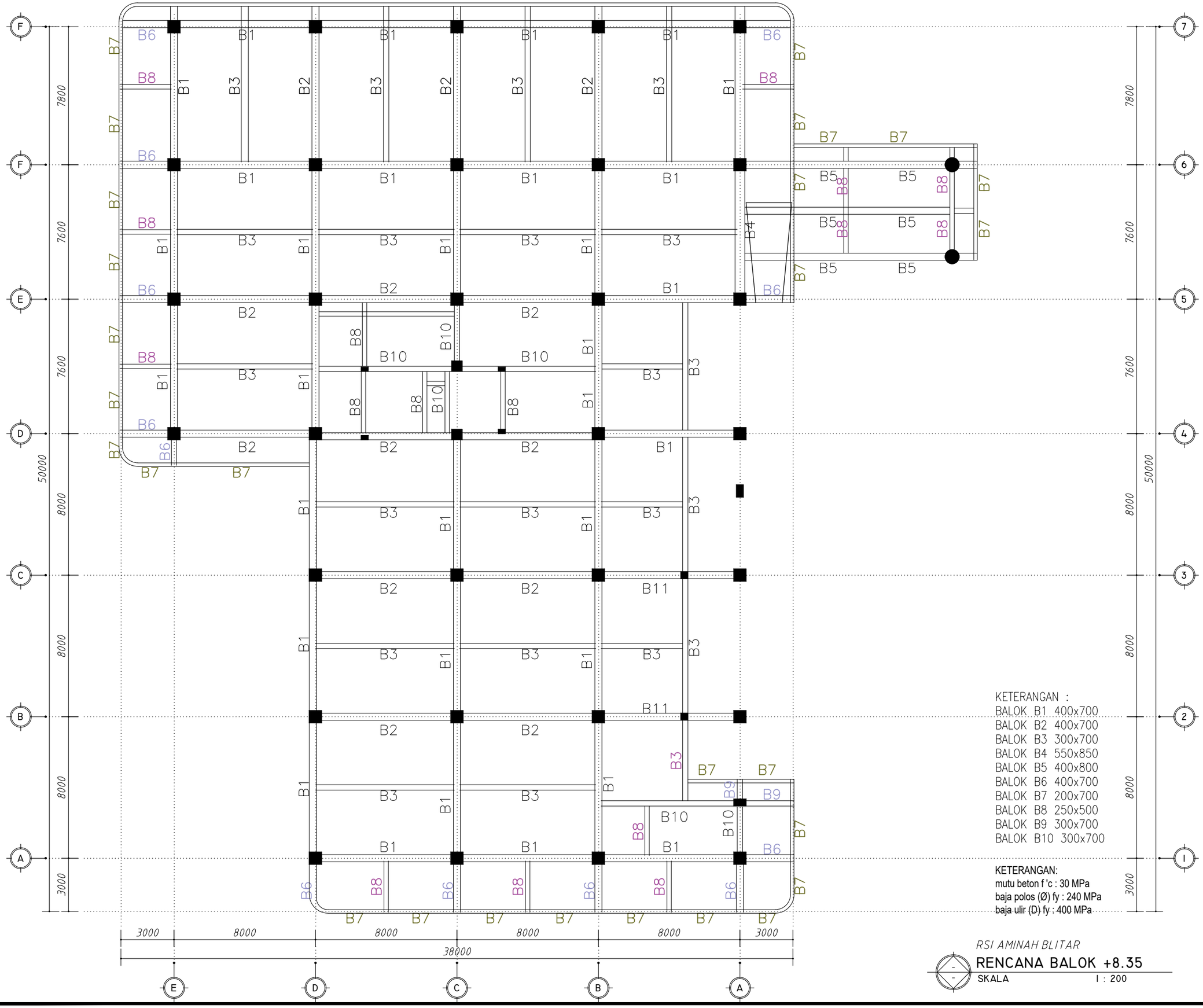
HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA BALOK +4.15		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR04-001	-



KETERANGAN :
BALOK B1 400x700
BALOK B2 400x700
BALOK B3 300x700
BALOK B4 550x850
BALOK B5 400x800
BALOK B6 400x700
BALOK B7 200x700
BALOK B8 250x500
BALOK B9 300x700
BALOK B10 300x700

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA BALOK +8.35

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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MENGETAHUI

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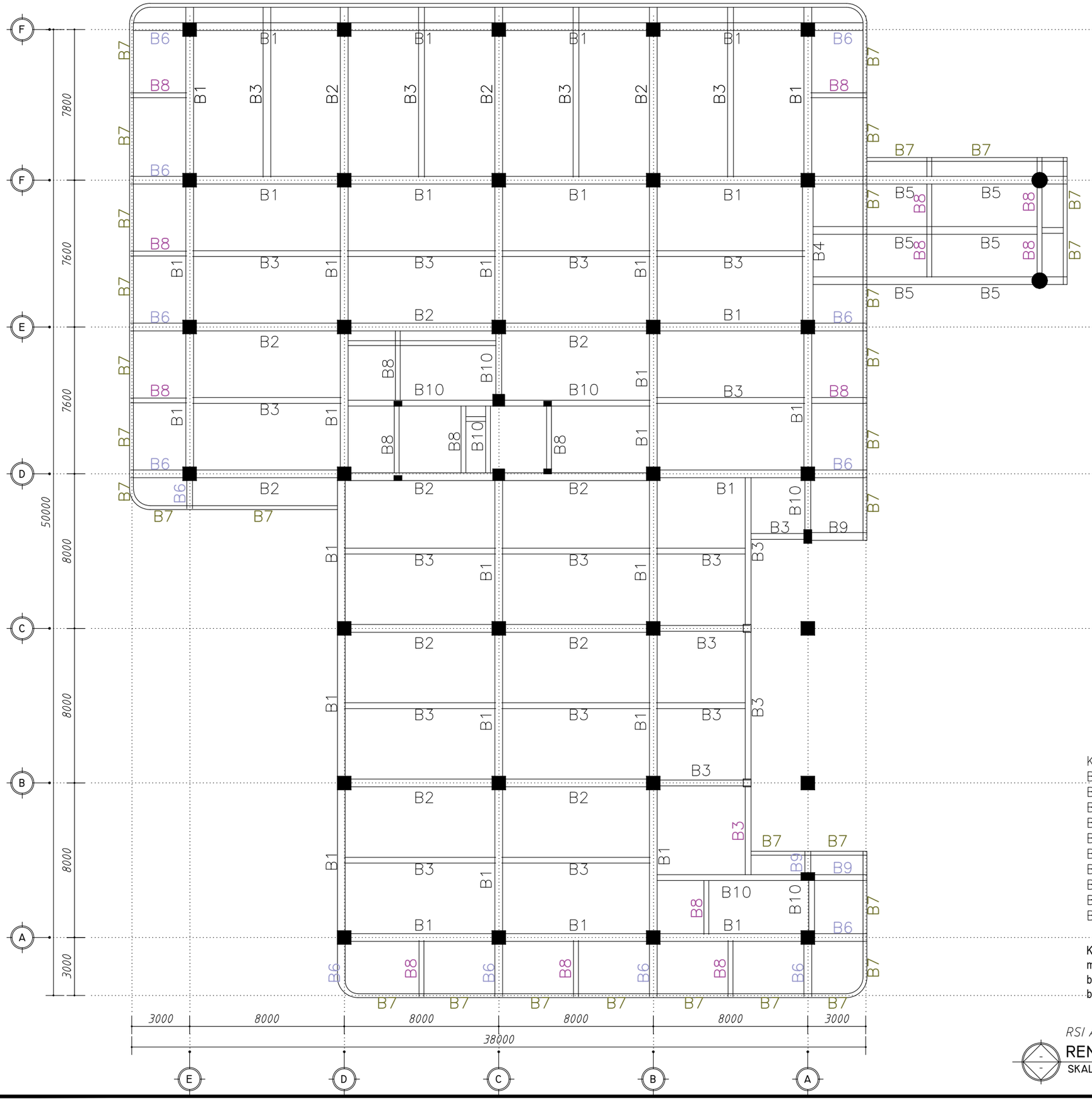
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA BALOK +8.35		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR04-002	-



KETERANGAN :
BALOK B1 400x700
BALOK B2 400x700
BALOK B3 300x700
BALOK B4 550x850
BALOK B5 400x800
BALOK B6 400x700
BALOK B7 200x700
BALOK B8 250x500
BALOK B9 300x700
BALOK B10 300x700

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA BALOK +12.55

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

Jl. Kenari No.54, Plosokerep, Kec. Sananwetan,
Kota Blitar, Jawa Timur 66134

MENYETUJUI

Direktur RSI Aminah Blitar

dr. Mutia Farah Fawziah DF, Sp.A, M.Kes
NBM. 1354 870

MENGETAHUI

Ketua PDM Kota Blitar

Lukiarto, SKM
NBM. 978 811

MENGETAHUI

Ketua PDM Kabupaten Blitar

Sigit Prasetyo, SE
NBM. 987 201

KONSULTAN PERENCANA

feroz arcadia

ARSITEK :

Ar. Muhammad Fauzan, M.A.R.S., IAI
SKA IAI : 1.1.100.2.02.09.045314

PERENCANA STRUKTUR :

Eko Sulistiyatmojo, S.T

PERENCANA ME :

Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

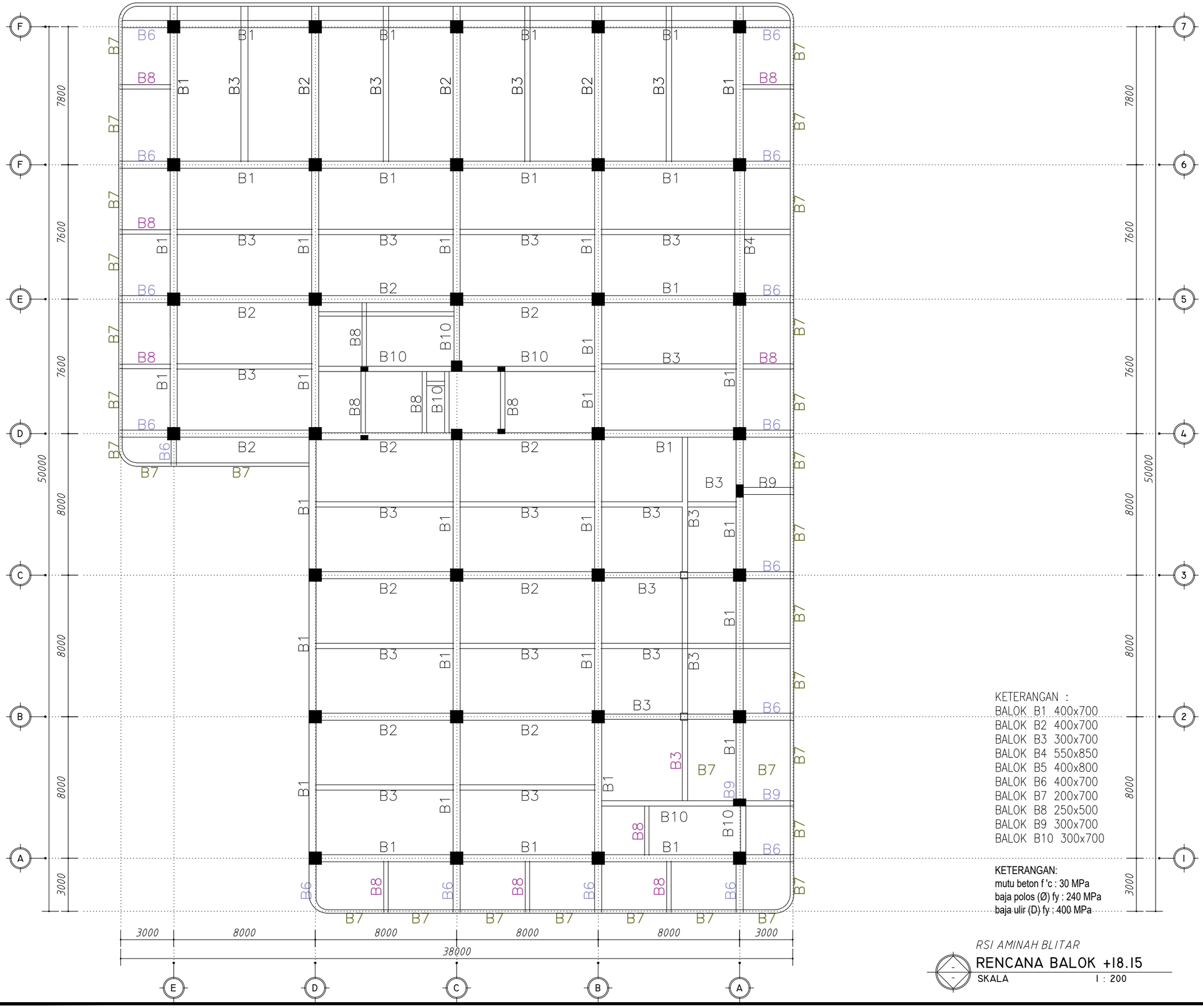
HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023

NAMA GAMBAR

RENCANA BALOK +12.55

SKALA	1:200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR04-003	-



RSI AMINAH BLITAR

RENCANA BALOK +18.15

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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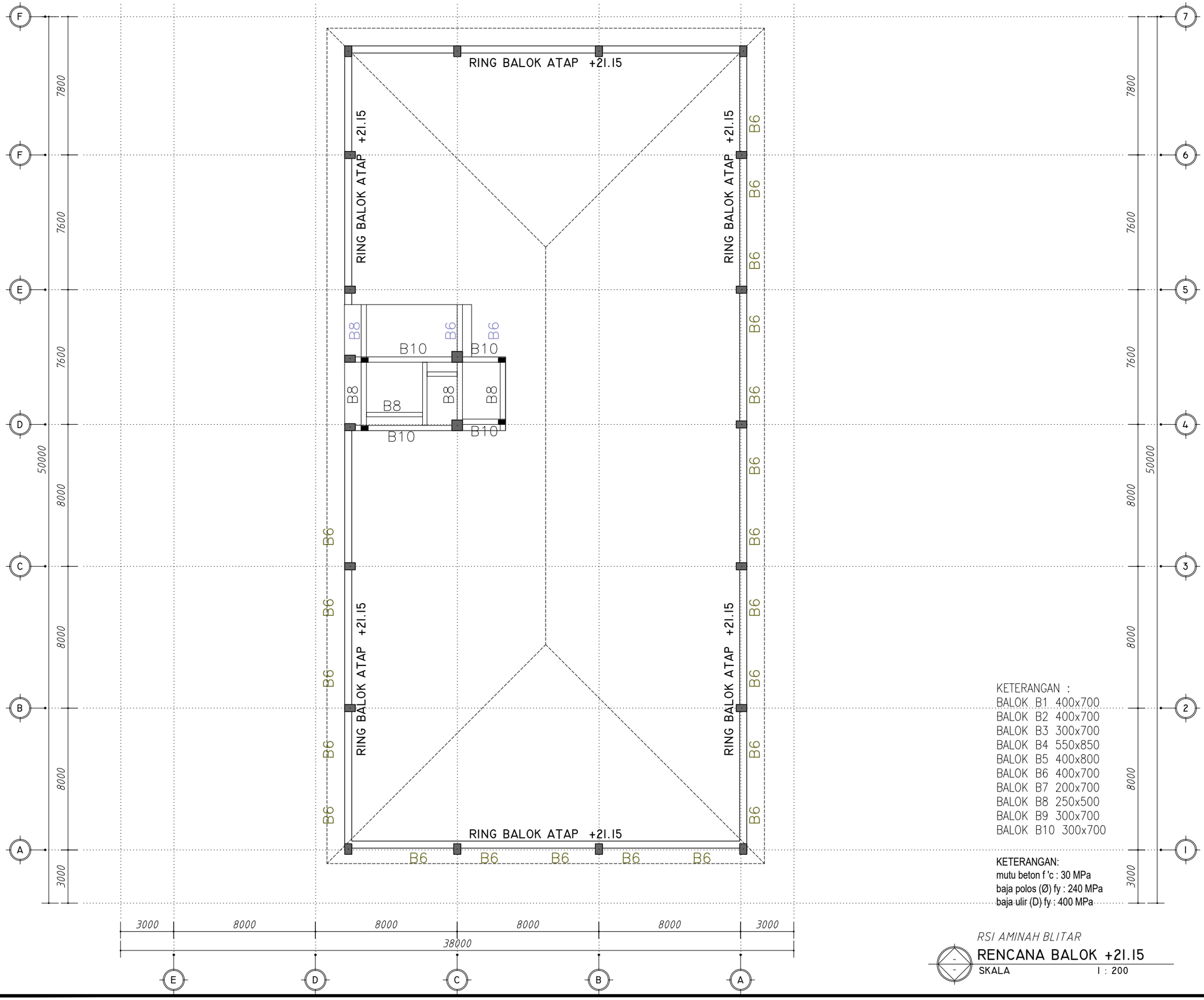
TANGGAL	21 June 2023

NAMA GAMBAR

RENCANA BALOK +17.55

SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR04-004	-


RING BALOK ATAP +21.15
RING BALOK ATAP +21.15
RING BALOK ATAP +21.15
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RING BALOK ATAP +21.15
B8
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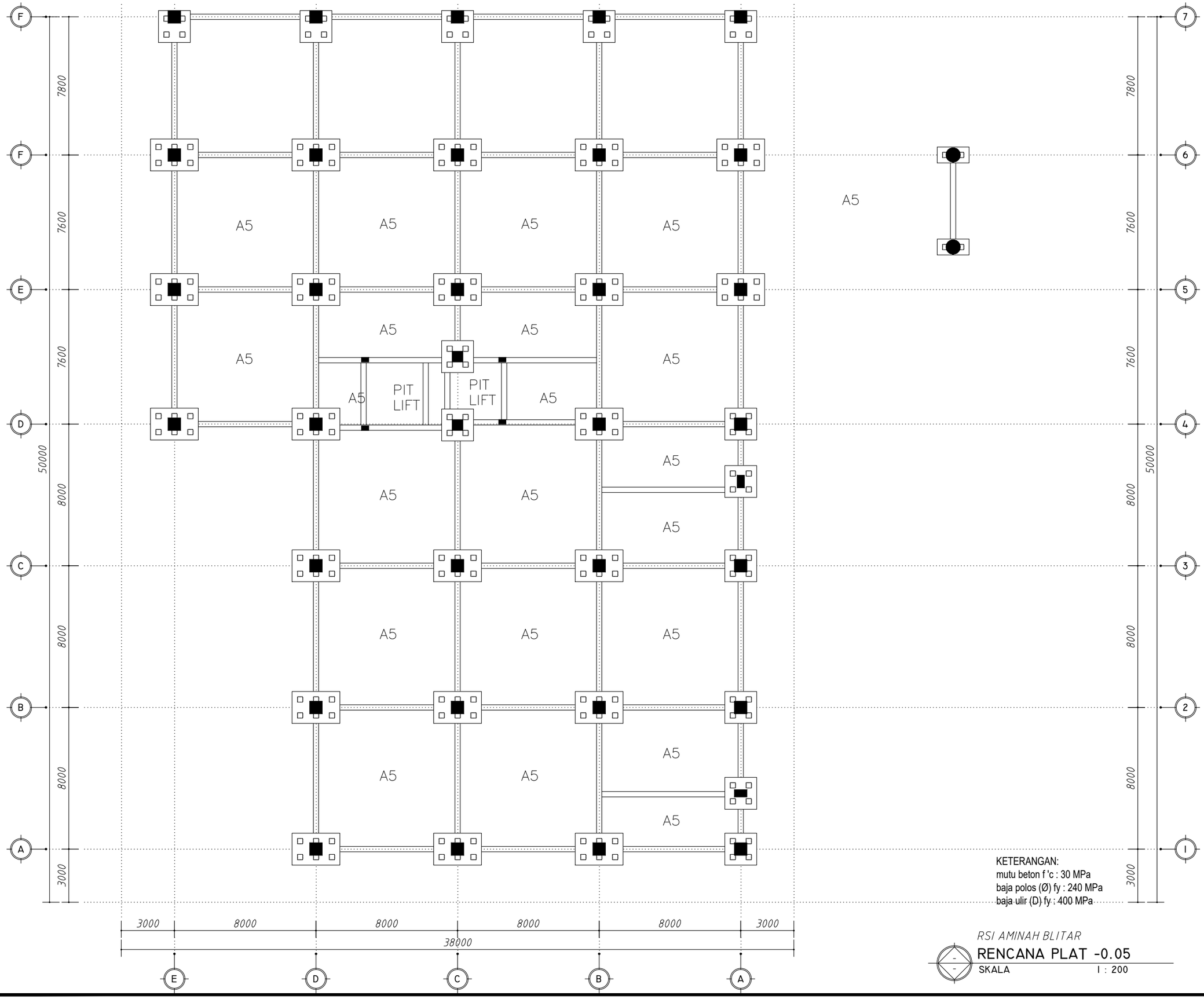
B6



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT -0.05

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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Sigit Prasetyo, SE
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KONSULTAN PERENCANA

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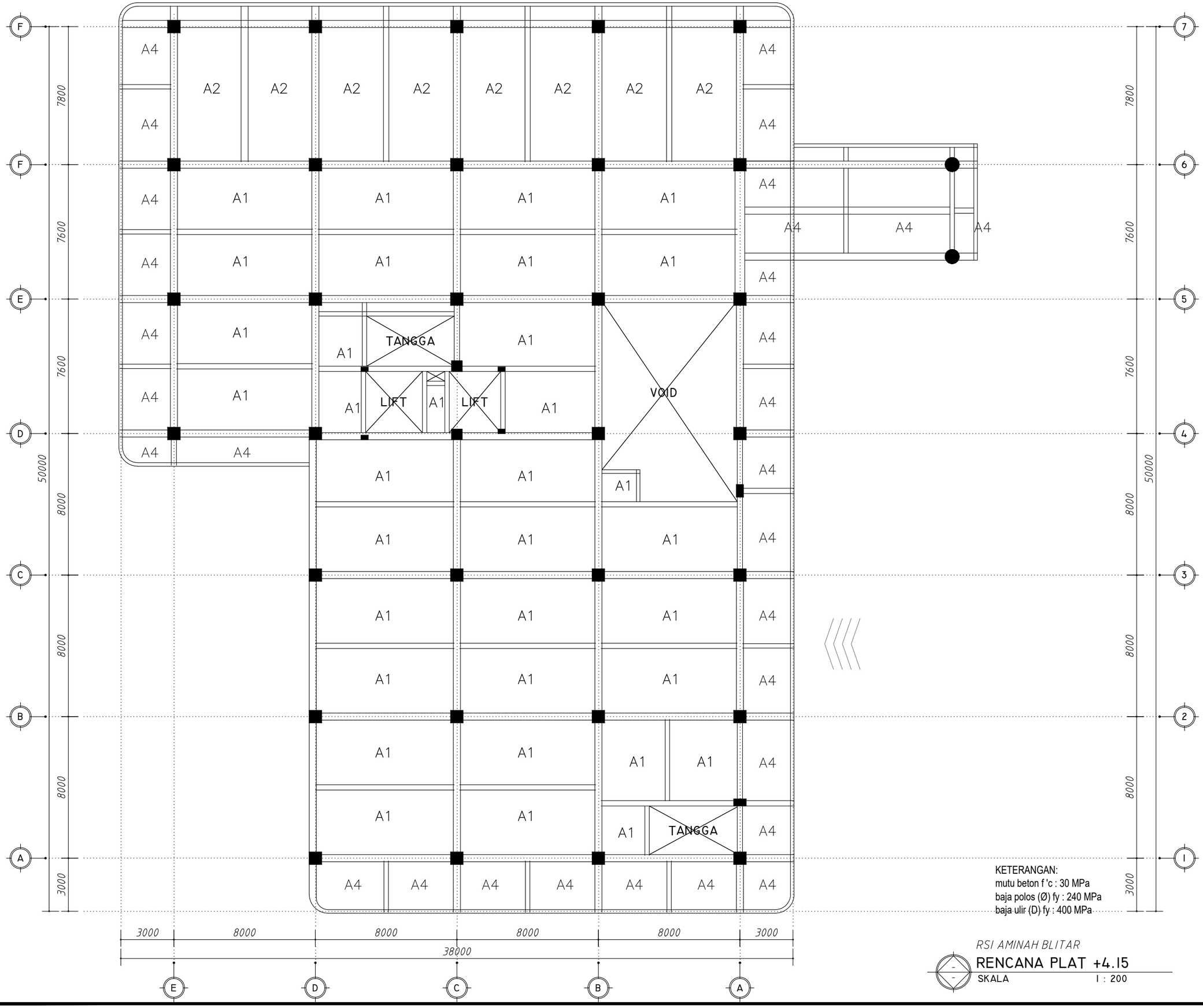
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA PLAT -0.05 -		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR05-00I	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT +4.15

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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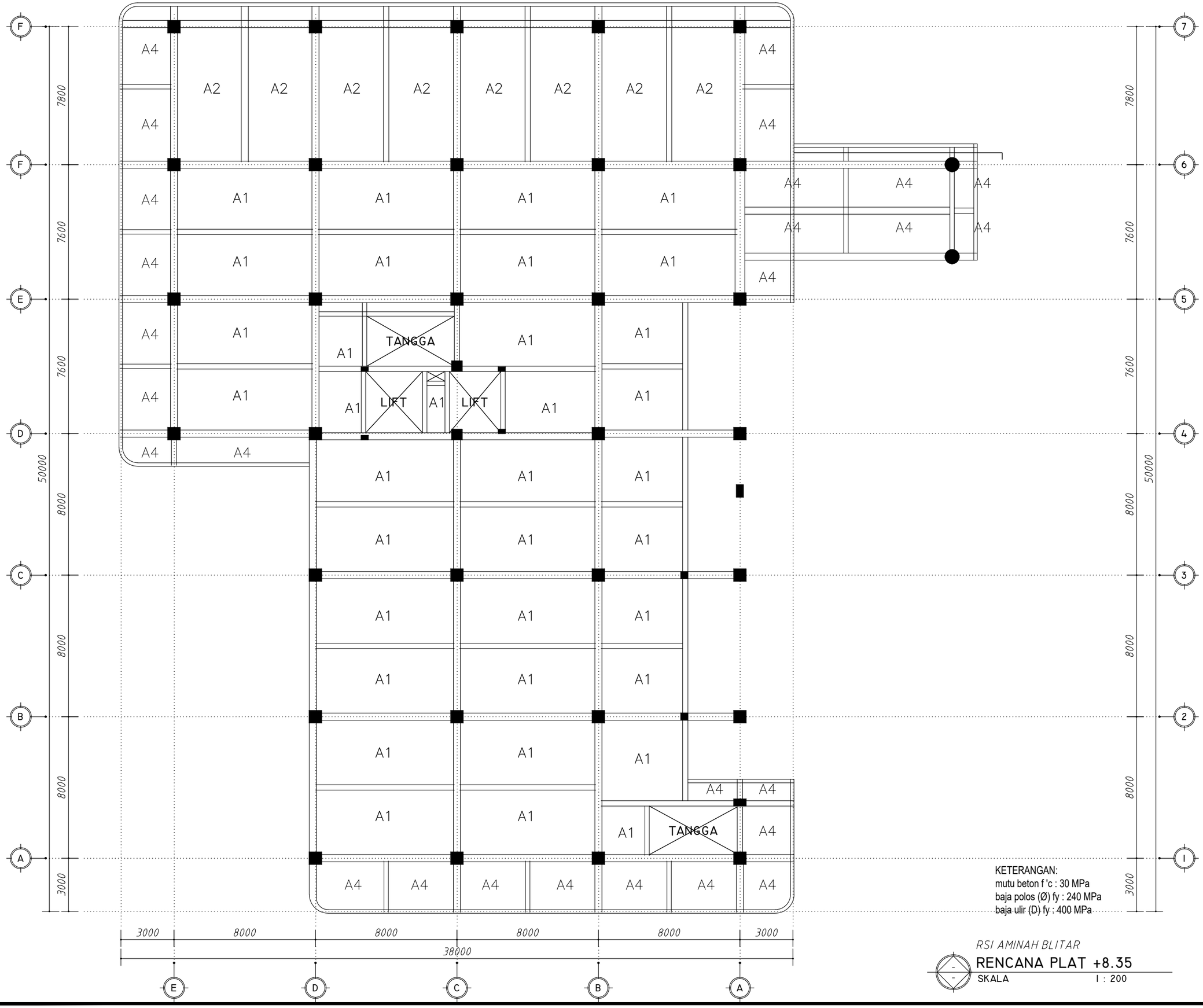
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA PLAT +4.15		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR05-002	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT +8.35

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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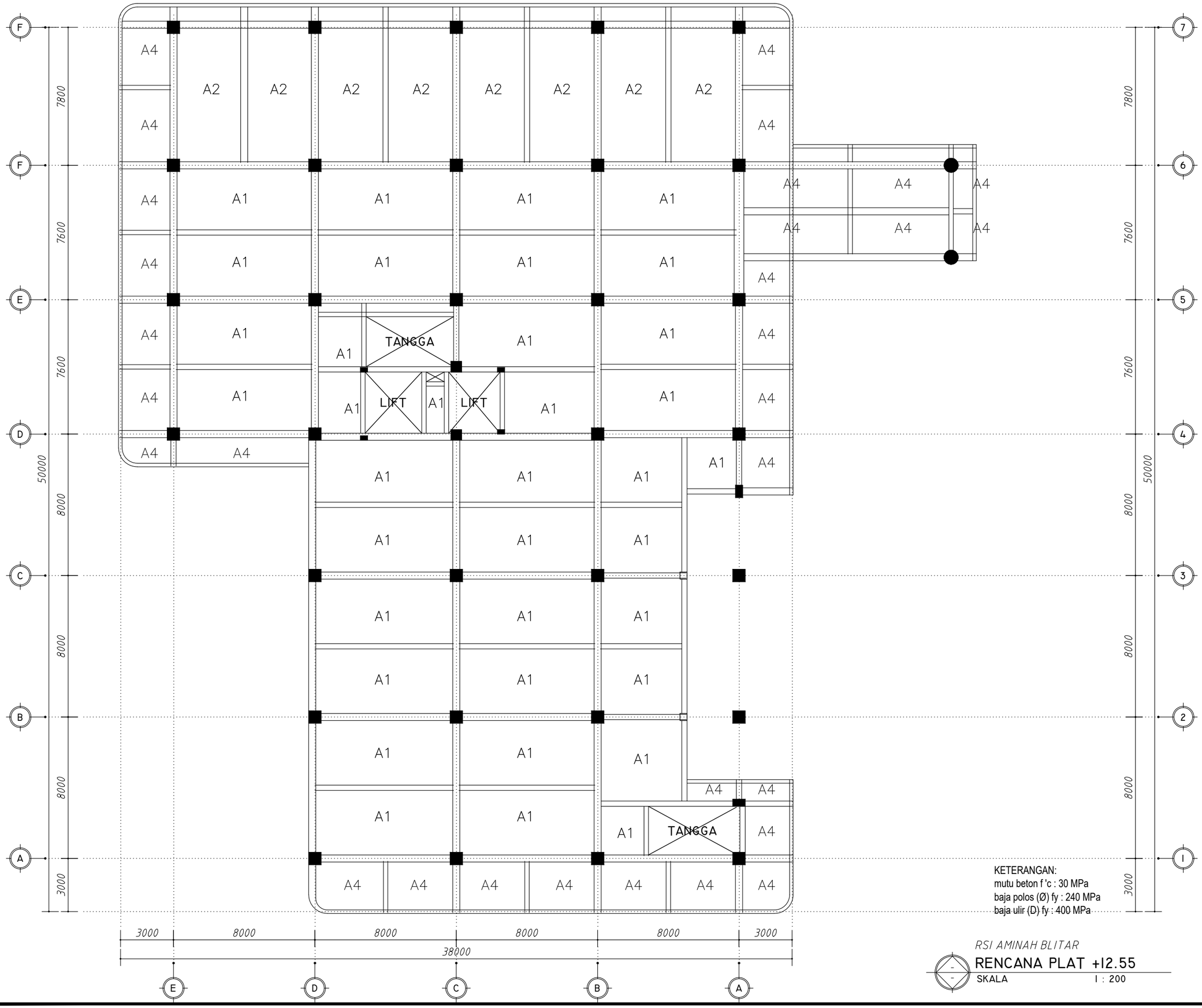
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA PLAT +8.35		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR05-003	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT +12.55

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
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TANGGAL	21 June 2023

NAMA GAMBAR

RENCANA PLAT +12.55

SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
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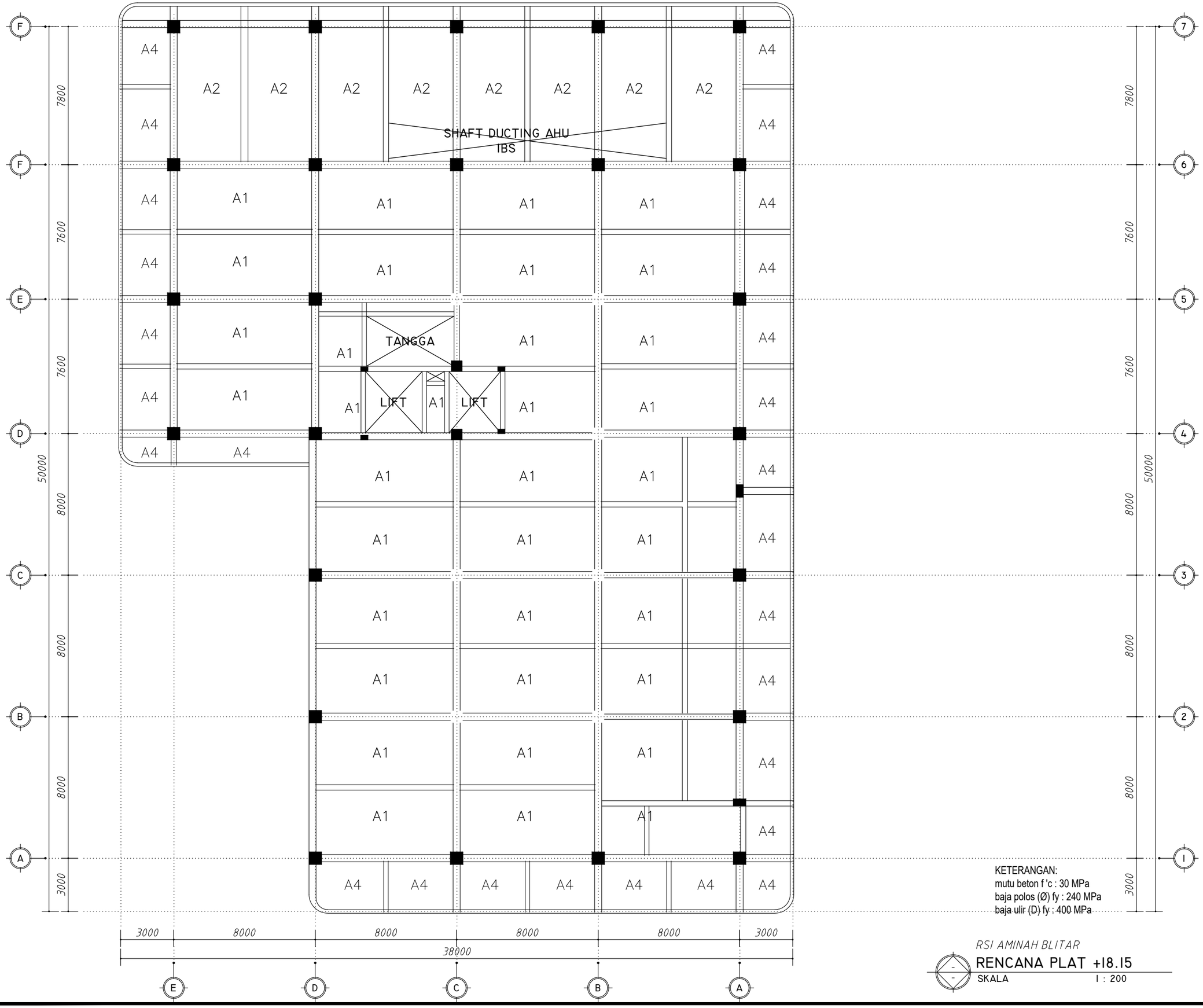

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT +18.15

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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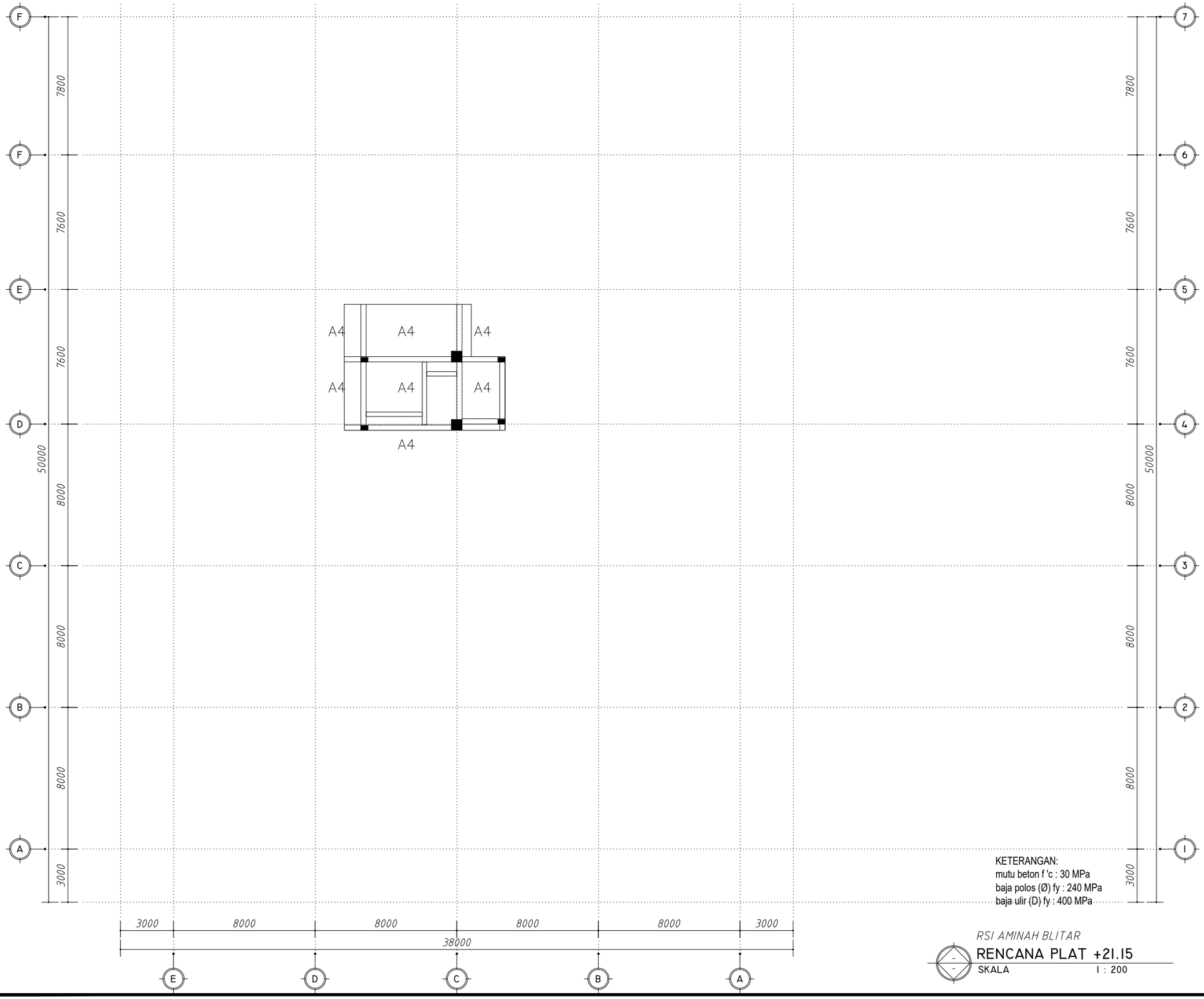
TANGGAL	21 June 2023	
NAMA GAMBAR		
RENCANA PLAT +17.55		
SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR05-005	-



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

RENCANA PLAT +21.15

SKALA 1 : 200

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

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TANGGAL	21 June 2023

NAMA GAMBAR

RENCANA PLAT +21.75

SKALA	1: 200	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR05-006	-

TYPE / LANTAI	KOLOM K1		KOLOM K2		KOLOM K3	
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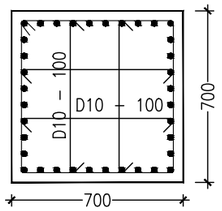
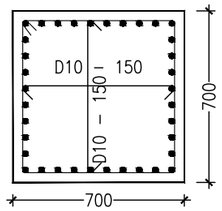
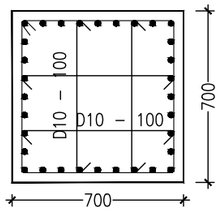
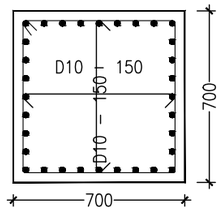
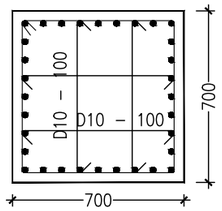
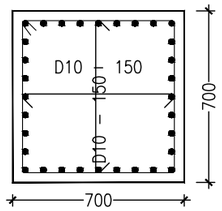
LANTAI 1						
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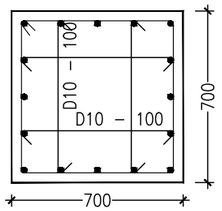
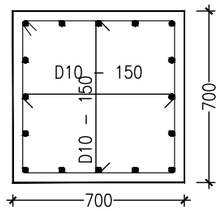
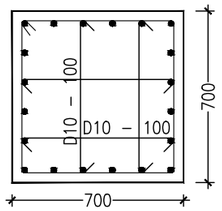
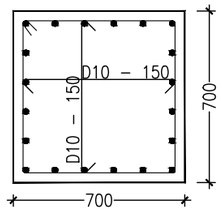
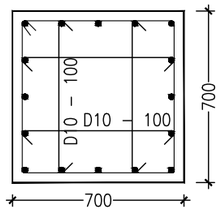
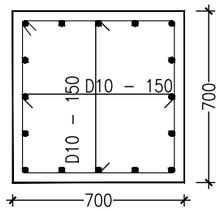
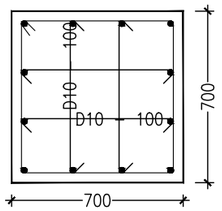
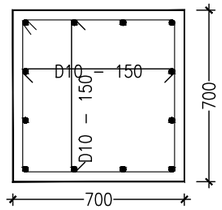
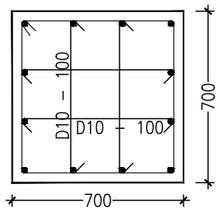
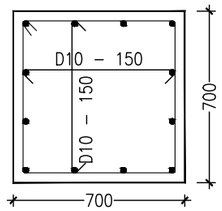
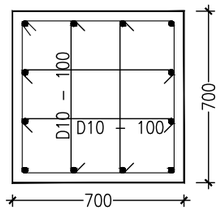
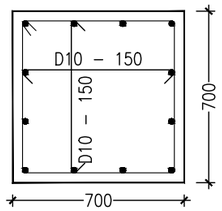
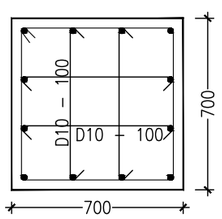
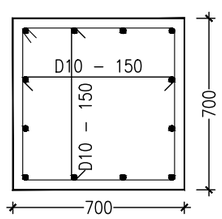
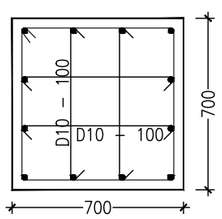
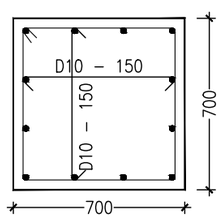
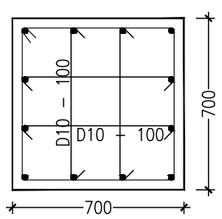
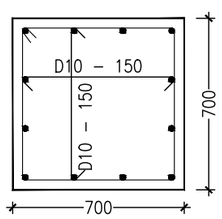
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		700 x 700		700 x 700	
LANTAI 2						
TUL. UTAMA	16 D25	16 D25	20 D25	20 D25	16 D25	16 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		700 x 700		700 x 700	
LANTAI 3						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		700 x 700		700 x 700	
LANTAI 4						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		700 x 700		700 x 700	

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL KOLOM

SKALA 1 : 25

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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NBM. 978 811

MENGETAHUI

Ketua PDM Kabupaten Blitar

Sigit Prasetyo, SE
NBM. 987 201

KONSULTAN PERENCANA

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Ar. Muhammad Fauzan, M.A.R.S., IAI
SKA IAI : 1.1.100.2.02.09.045314

PERENCANA STRUKTUR :

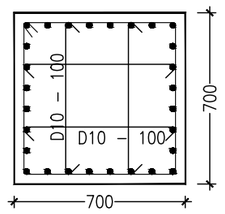
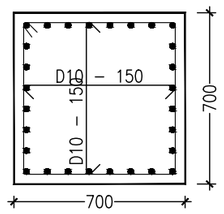
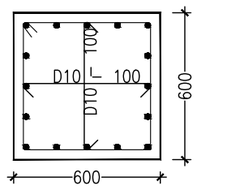
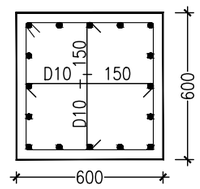
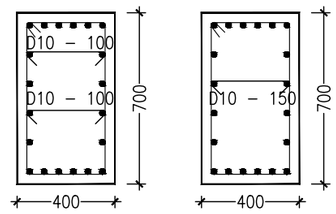
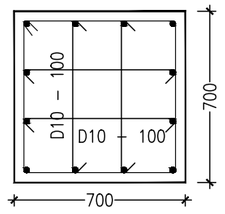
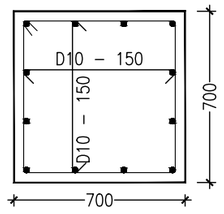
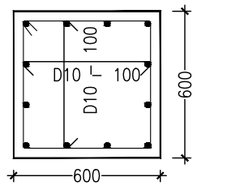
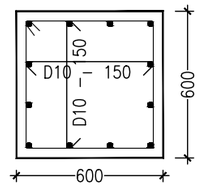
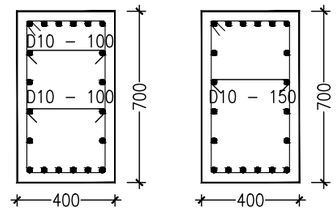
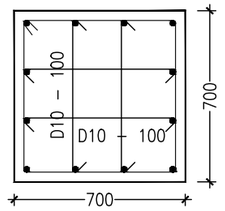
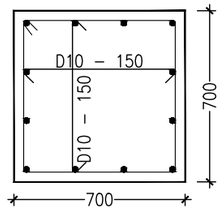
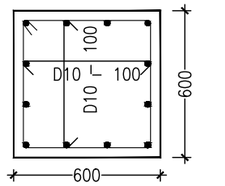
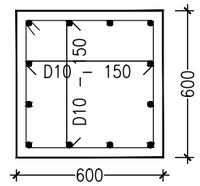
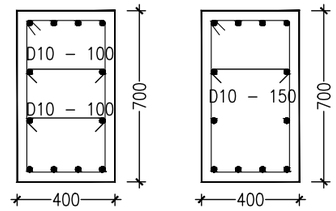
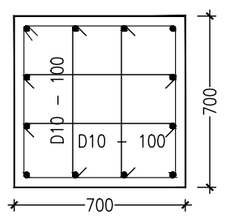
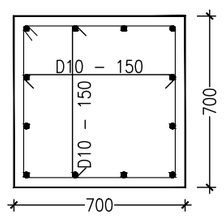
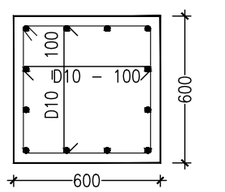
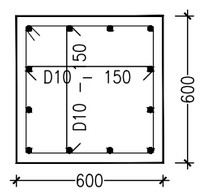
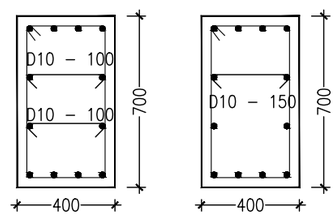
Eko Sulistiyatmojo, S.T

PERENCANA ME :

Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023	
NAMA GAMBAR		
DETIL KOLOM		
SKALA	1: 25	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR09-001	-

TYPE / LANTAI	KOLOM K4		KOLOM K5		KOLOM K6	
	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
LANTAI 1						
TUL. UTAMA	28 D25	28 D25	16 D25	16 D25	20 D25	20 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		600 x 600		400 x 700	
LANTAI 2						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	20 D25	20 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		600 x 600		400 x 700	
LANTAI 3						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		600 x 600		400 x 700	
LANTAI 4						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		600 x 600		400 x 700	

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL KOLOM

SKALA 1 : 25

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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Kota Blitar, Jawa Timur 66134

MENYETUJUI

Direktur RSI Aminah Blitar

dr. Mutia Farah Fawziah DF, Sp.A, M.Kes
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MENGETAHUI

Ketua PDM Kota Blitar

Lukiarto, SKM
NBM. 978 811

MENGETAHUI

Ketua PDM Kabupaten Blitar

Sigit Prasetyo, SE
NBM. 987 201

KONSULTAN PERENCANA

feroz arcadia

ARSITEK :

Ar. Muhammad Fauzan, M.A.R.S., IAI
SKA IAI : 1.1.100.2.02.09.045314

PERENCANA STRUKTUR :

Eko Sulistiyatmojo, S.T

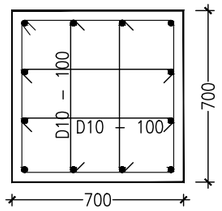
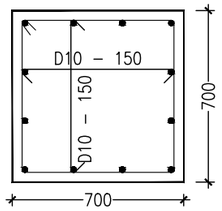
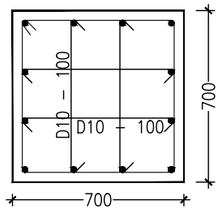
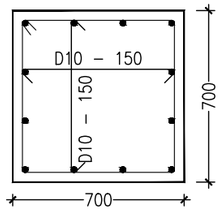
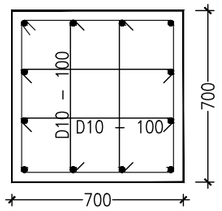
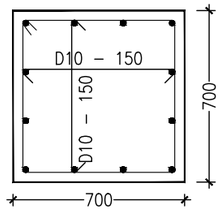
PERENCANA ME :

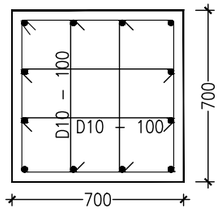
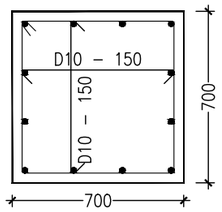
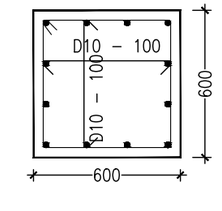
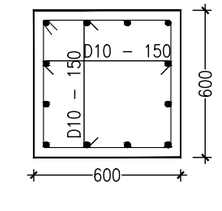
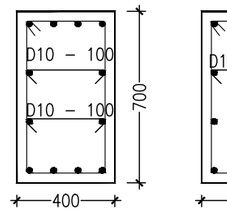
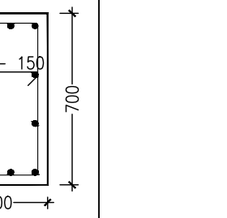
Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

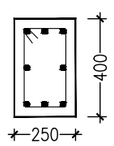
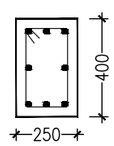
HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

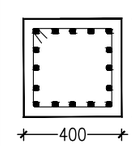
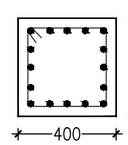
TANGGAL	21 June 2023
NAMA GAMBAR	DETIL KOLOM
SKALA	1: 25

KODE	NO. GAMBAR	JML LEMBAR
STR	STR09-002	-

TYPE / LANTAI	KOLOM K1		KOLOM K2		KOLOM K3	
	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
LANTAI 5						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		700 x 700		700 x 700	

TYPE / LANTAI	KOLOM K4		KOLOM K5		KOLOM K6	
	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
LANTAI 5						
TUL. UTAMA	12 D25	12 D25	12 D25	12 D25	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 150
DIMENSI	700 x 700		600 x 600		400 x 700	

TYPE / LANTAI	KOLOM KL	
	TUMPUAN	LAPANGAN
LANTAI 1 s/d ATAP		
TUL. UTAMA	8 D16	8 D16
SENGKANG	D10 – 100	D10 – 150
DIMENSI	250 x 400	

TYPE / LANTAI	KOLOM K8	
	TUMPUAN	LAPANGAN
Lantai 2 s/d lantai 3		
TUL. UTAMA	16 D19	16 D19
SENGKANG	D10 – 100	D10 – 150
DIMENSI	400 x 400	

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR
DETIL KOLOM
SKALA 1 : 25

PEMBERI TUGAS
RS ISLAM AMINAH BLITAR

PEKERJAAN
PEMBANGUNAN GEDUNG RS ISLAM AMINAH BLITAR

KEGIATAN
PEMBANGUNAN GEDUNG RS ISLAM AMINAH BLITAR

LOKASI PEKERJAAN
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MENYETUJUI
Direktur RSI Aminah Blitar
dr. Mutia Farah Fawziah DF, Sp.A, M.Kes
NBM. 1354 870

MENGETAHUI
Ketua PDM Kota Blitar
Lukiarto, SKM
NBM. 978 811

MENGETAHUI
Ketua PDM Kabupaten Blitar
Sigit Prasetyo, SE
NBM. 987 201

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Ar. Muhammad Fauzan, M.A.R.S., IAI
SKA IAI : 1.1.100.2.02.09.045314

PERENCANA STRUKTUR :
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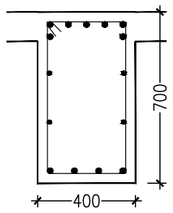
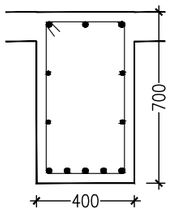
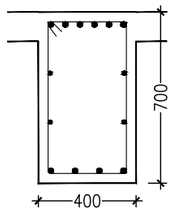
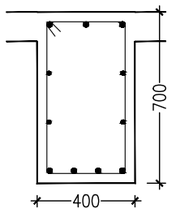
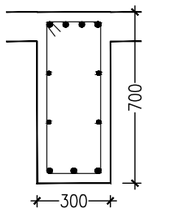
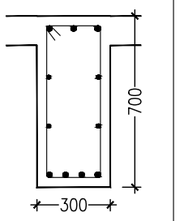
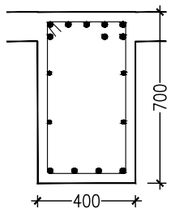
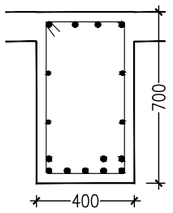
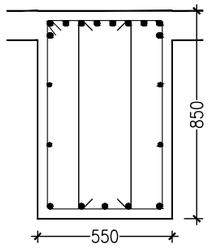
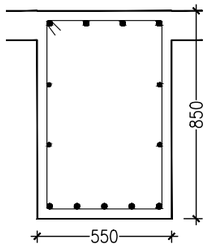
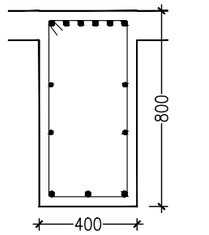
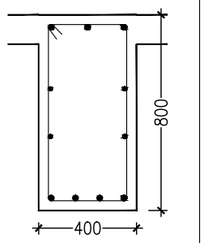
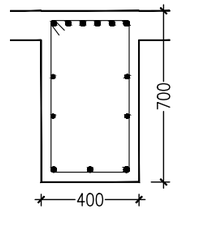
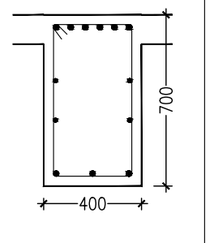
PERENCANA ME :
Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

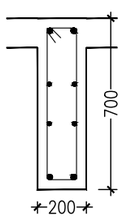
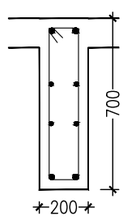
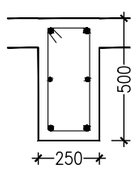
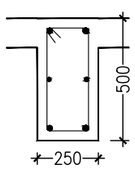
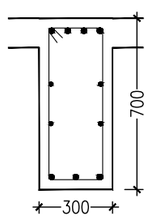
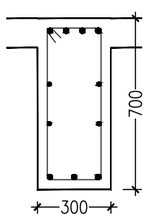
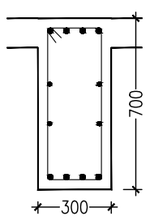
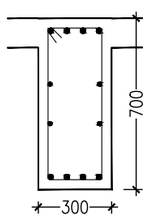
HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

TANGGAL	21 June 2023
NAMA GAMBAR	DETIL KOLOM
SKALA	1: 25

KODE	NO. GAMBAR	JML LEMBAR
STR	STR09-003	-

TYPE	BALOK B1 400x700		BALOK B2 400x700		BALOK B3 300x700		BALOK B11 400x700	
POSISI	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
POTONGAN								
TUL. ATAS	7 D25	3 D25	6 D25	3 D25	4 D19	3 D19	8 D25	4 D25
TUL. BAWAH	4 D25	5 D25	3 D25	4 D25	3 D19	4 D19	4 D25	8 D25
SENGKANG	D10 – 75	D10 – 100	D10 – 75	D10 – 150	D10 – 100	D10 – 150	D13 – 100	D13 – 100
TUL. PINGGANG	4 D10		4 D10		4 D10		4 D10	

TYPE	BALOK B4 550x850		BALOK B5 400x800		BALOK B6 400x700	
POSISI	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
POTONGAN						
TUL. ATAS	10 D25	4 D25	6 D25	3 D25	6 D25	6 D25
TUL. BAWAH	5 D25	5 D25	3 D25	4 D25	3 D25	3 D25
SENGKANG	2 D10 – 75	D10 – 100	D10 – 75	D10 – 150	D10 – 100	D10 – 100
TUL. PINGGANG	4 D10		4 D10		4 D10	

TYPE	BALOK B7 200x700		BALOK B8 250x500		BALOK B9 300x700		BALOK B10 300x700	
POSISI	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
POTONGAN								
TUL. ATAS	2 D19	2 D19	2 D19	2 D19	4 D25	4 D25	4 D25	4 D25
TUL. BAWAH	2 D19	2 D19	2 D19	2 D19	3 D25	3 D25	4 D25	4 D25
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150	D10 – 100	D10 – 100	D10 – 100	D10 – 100
TUL. PINGGANG	4 D10		2 D10		4 D10		4 D10	

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL BALOK

SKALA 1 : 25

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

Jl. Kenari No.54, Plosokerep, Kec. Sananwetan,
Kota Blitar, Jawa Timur 66134

MENYETUJUI

Direktur RSI Aminah Blitar

dr. Mutia Farah Fawziah DF, Sp.A, M.Kes
NBM. 1354 870

MENGETAHUI

Ketua PDM Kota Blitar

Lukiarto, SKM
NBM. 978 811

MENGETAHUI

Ketua PDM Kabupaten Blitar

Sigit Prasetyo, SE
NBM. 987 201

KONSULTAN PERENCANA

feroz arcadia

ARSITEK :

Ar. Muhammad Fauzan, M.A.R.S., IAI
SKA IAI : 1.1.100.2.02.09.045314

PERENCANA STRUKTUR :

Eko Sulistiyatmojo, S.T

PERENCANA ME :

Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

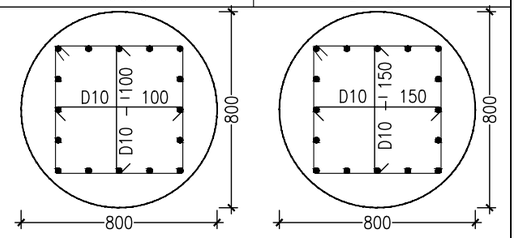
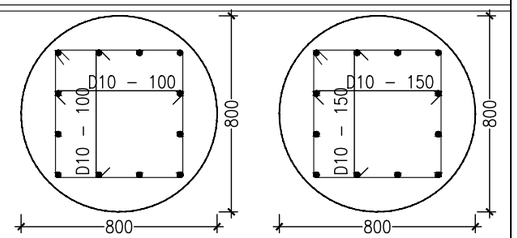
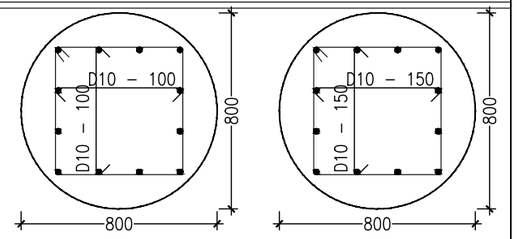
HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

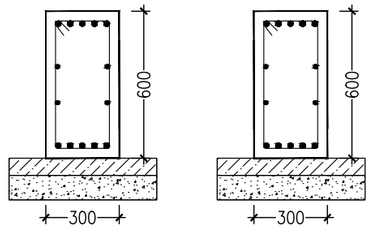
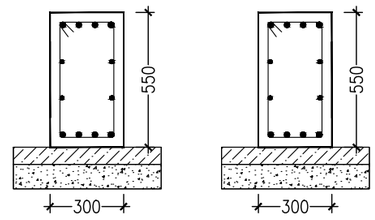
TANGGAL	21 June 2023

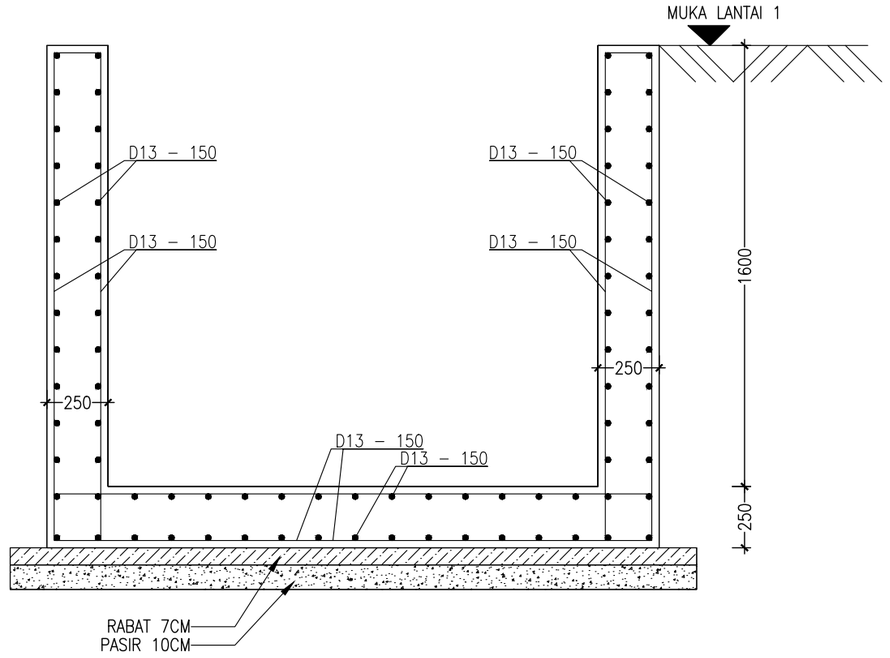
NAMA GAMBAR

DETIL BALOK

SKALA	1: 25	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR09-004	-

TYPE / LANTAI	KOLOM K7	
	TUMPUAN	LAPANGAN
LANTAI 1		
TUL. UTAMA	16 D25	16 D25
SENGKANG	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150
DIMENSI	D 800	
LANTAI 2		
TUL. UTAMA	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150
DIMENSI	D 800	
LANTAI 3		
TUL. UTAMA	12 D25	12 D25
SENGKANG	D10 – 100	D10 – 150
TUL. IKAT	D10 – 100	D10 – 150
DIMENSI	D 800	

TYPE	SLOOF S1 300x600		SLOOF S2 300x550	
POSISI	TUMPUAN	LAPANGAN	TUMPUAN	LAPANGAN
POTONGAN				
TUL. ATAS	5 D19	5 D19	4 D19	4 D19
TUL. BAWAH	5 D19	5 D19	4 D19	4 D19
SENGKANG	D10 – 100	D10 – 150	D10 – 100	D10 – 150
TUL. PINGGANG	4 D10		4 D10	



KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL KOLOM, SLOOF & PIT LIF

SKALA 1 : 25

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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MENGETAHUI

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PERENCANA ME :

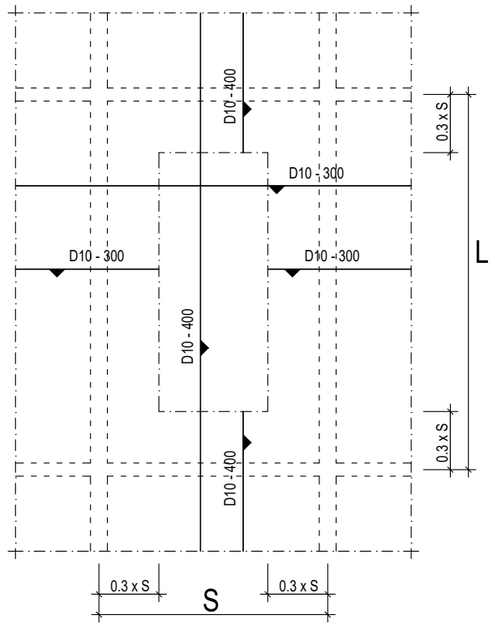
Sutrisno, S.T.
No. Reg. F 1997 01640 2023 0107172 ME 05

HAK CIPTA DILINDUNGI UNDANG-UNDANG DILARANG MENIRU, MENYALIN, MEMPERBANYAK DAN MENGUBAH SELURUH ATAU SEBAGIAN ISI GAMBAR DAN DESAIN UNTUK KEPENTINGAN LAIN TANPA SEIJIN DAN SEPENGETAHUAN FEROZ ARCADIA STUDIO

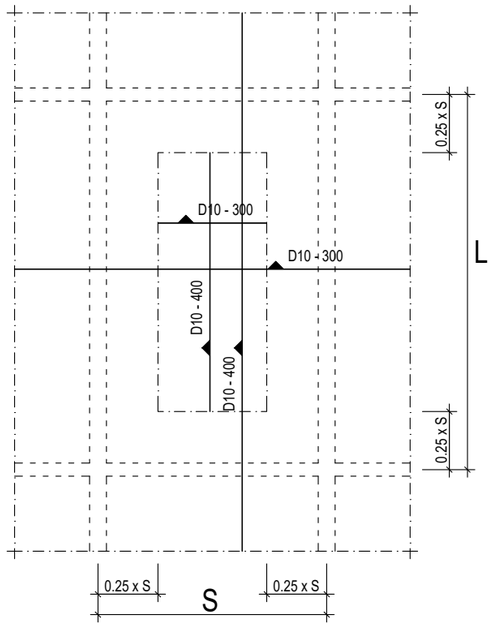
TANGGAL	21 June 2023	
NAMA GAMBAR		
DETIL KOLOM, SLOOF & PIT LIF		
SKALA	1: 25	
KODE	NO. GAMBAR	JML LEMBAR
STR	STR09-005	-

A1 PLAT LANTAI T = 140 MM

TULANGAN ATAS



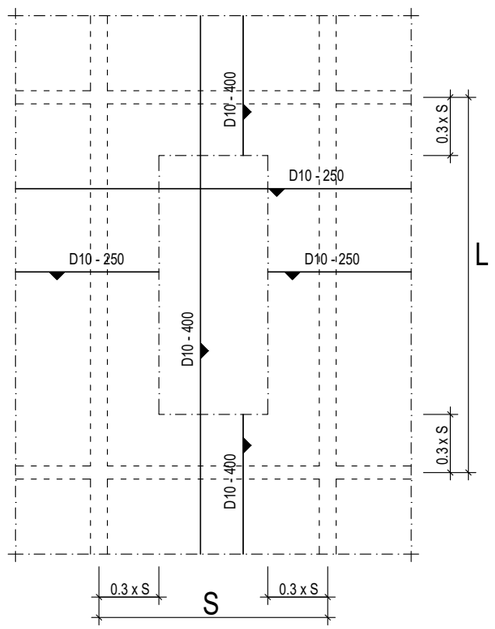
TULANGAN BAWAH



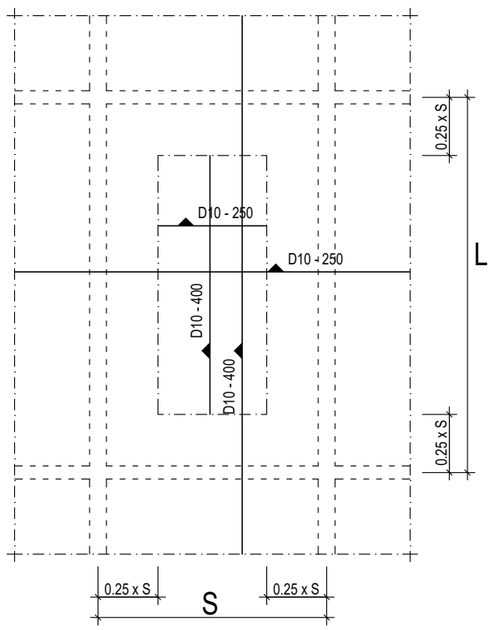
S = BENTANG PENDEK
L = BENTANG PANJANG

A2 PLAT LANTAI T = 140 MM

TULANGAN ATAS



TULANGAN BAWAH



S = BENTANG PENDEK
L = BENTANG PANJANG

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL PLAT

SKALA NTS

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

KEGIATAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
BLITAR

LOKASI PEKERJAAN

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PERENCANA ME :

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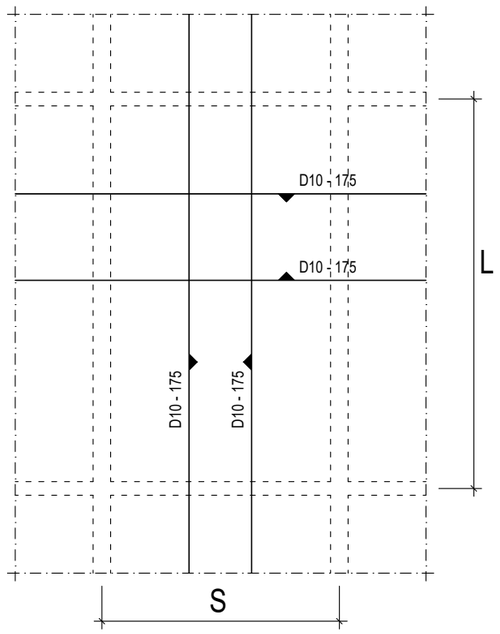
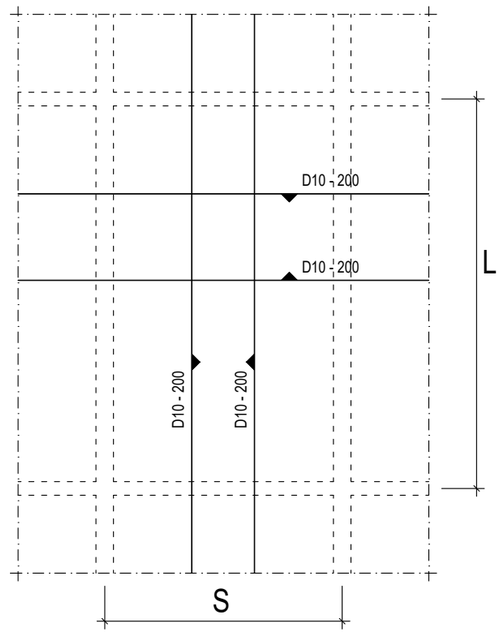
TANGGAL	21 June 2023	
NAMA GAMBAR		
DETIL PLAT		
SKALA	NTS	
KODE	NO. GAMBAR	JML LEMBAR
STR	STRI0-001	-

A3 PLAT LANTAI T = 200 MM



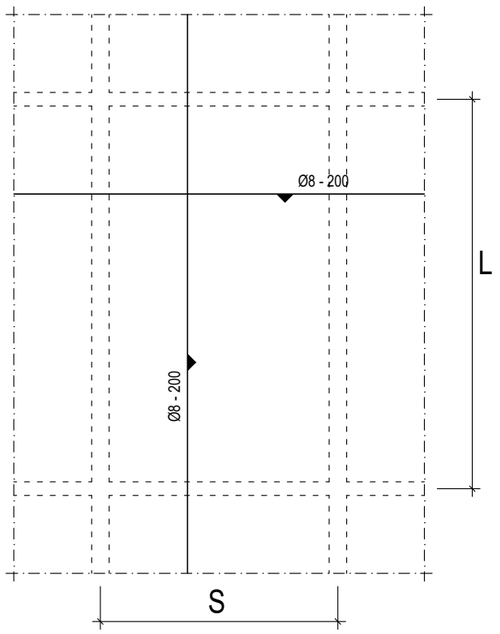
S = BENTANG PENDEK
L = BENTANG PANJANG

A4 PLAT LANTAI T = 140 MM



S = BENTANG PENDEK
L = BENTANG PANJANG

A5 PLAT LANTAI T = 100 MM



S = BENTANG PENDEK
L = BENTANG PANJANG

KETERANGAN:
mutu beton f 'c : 30 MPa
baja polos (Ø) fy : 240 MPa
baja ulir (D) fy : 400 MPa

RSI AMINAH BLITAR

DETIL PLAT
SKALA NTS

PEMBERI TUGAS

RS ISLAM AMINAH
BLITAR

PEKERJAAN

PEMBANGUNAN GEDUNG
RS ISLAM AMINAH
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Ketua PDM Kabupaten Blitar

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NBM. 987 201

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No. Reg. F 1997 01640 2023 0107172 ME 05

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TANGGAL	21 June 2023	
NAMA GAMBAR		
DETIL PLAT		
SKALA	NTS	
KODE	NO. GAMBAR	JML LEMBAR
STR	STRI0-002	-