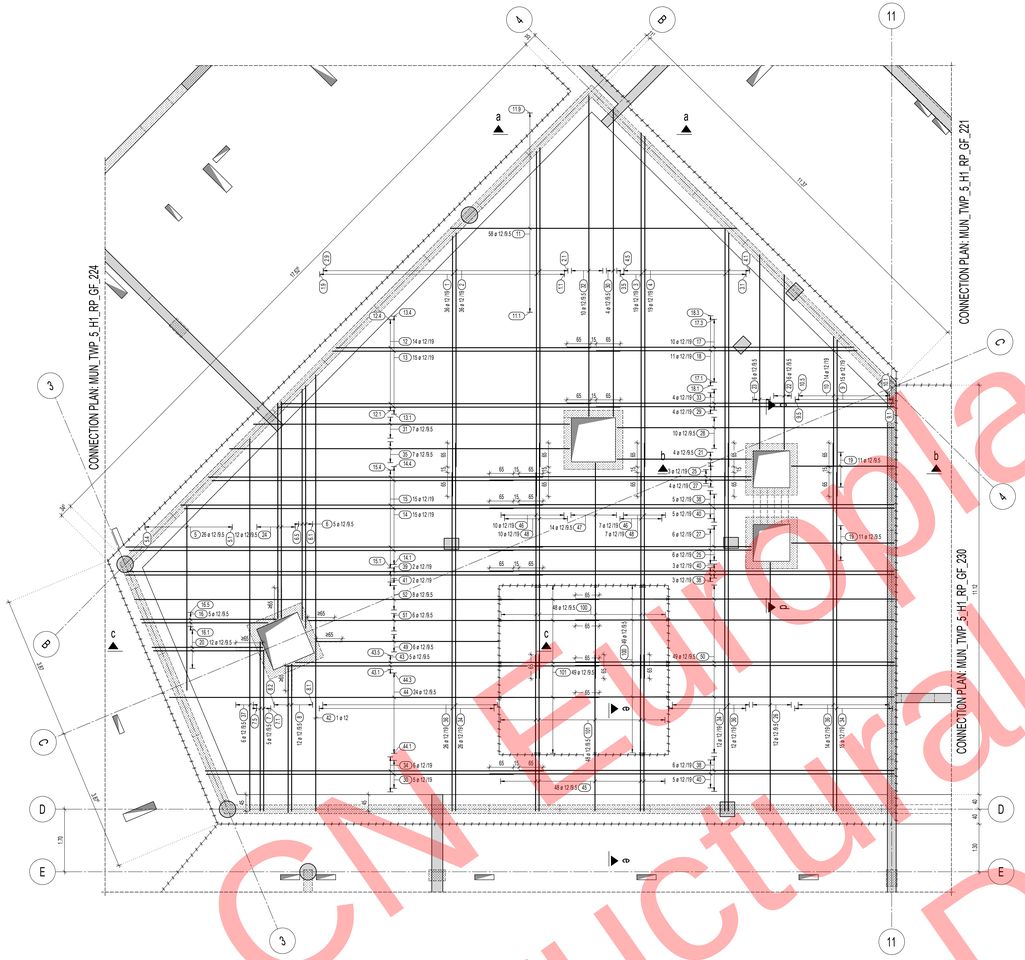
Slab above GF part 3 - bottom layer

Grid 3-11/B-D

C30/37 - WP, $c_{v,top}$=3,5cm, $c_{v,bot}$=2,5cm

Scale 1:50



Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	36	12	-X-		254.32	225.84
2	36	12	-X-		228.96	203.32
3	19	12	-X-		163.48	145.17
4	19	12	-X-		146.50	130.09
5	26	12	-X-		157.72	140.06
6	5	12	-X-		33.00	29.30
7	5	12	-X-		21.91	19.46
8	12	12	-X-		49.44	43.90
9	15	12	-X-		63.84	56.69
10	14	12	-X-		48.19	42.79
11	58	12	-X-		400.52	355.66
12	14	12	-X-		104.48	92.78
13	15	12	-X-		124.05	110.16
14	15	12	-X-		141.00	125.21
15	15	12	-X-		154.35	137.06
16	5	12	-X-		18.52	16.45
17	10	12	-X-		79.54	70.63
18	11	12	-X-		78.76	69.94
19	22	12	2.80	280	61.60	54.70
20	12	12	3.01	301	36.12	32.07
21	4	12	3.66	366	14.64	13.00
22	6	12	4.75	475	28.50	25.31
23	6	12	5.30	530	31.80	28.24
24	12	12	5.87	587	70.44	62.55
25	9	12	6.32	632	56.88	50.51
26	12	12	6.76	676	81.12	72.03
27	10	12	7.12	712	71.20	63.23

Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
28	10	12	7.54	754	75.40	66.96
29	4	12	8.10	810	32.40	28.77
30	9	12	8.35	835	75.15	66.73
31	7	12	8.60	860	60.20	53.46
32	10	12	8.72	872	87.20	77.43
33	4	12	8.90	890	35.60	31.61
34	59	12	9.20	920	542.80	482.01
35	7	12	9.25	925	64.75	57.50
36	52	12	10.00	1000	520.00	461.76
37	6	12	10.12	1012	60.72	53.92
38	14	12	10.20	1020	142.80	126.81
39	2	12	10.50	1050	21.00	18.65
40	13	12	11.00	1100	143.00	126.98
41	2	12	11.33	1133	22.66	20.12
42	1	12	11.85	1185	11.85	10.52
43	5	12	-X-	A12N	27.57	24.48
44	24	12	-X-	A12N	206.72	183.57
45	48	12	1.50	A12N 150 (150.1)	72.00	63.94
46	17	12	3.04	A12N 304 (307)	51.68	45.89
47	14	12	3.30	A12N 330 (333)	46.20	41.03
48	17	12	3.84	A12N 384 (387)	65.28	57.97
49	6	12	4.93	A12N 492 (495)	29.58	26.27
50	49	12	6.11	A12N 611 (614.1)	299.39	265.86
51	6	12	5.17	A12N 517 (520)	31.02	27.55
52	8	12	9.88	A12N 988 (991)	79.04	70.19
100	97	12	2.56	L0 256	248.32	220.51
101	97	12	2.75	L0 275	266.75	236.87

Total mass 5363.48

Related plans:

Reinforcement plan No.:
MUN_TWP_5_H1_RB_GF_216, MUN_TWP_5_H1_RB_GF_220, MUN_TWP_5_H1_RB_GF_228, MUN_TWP_5_H1_RB_GF_231, MUN_TWP_5_H1_RB_GF_229, MUN_TWP_5_H1_RB_GF_232

Formwork plan No.:
MUN_TWP_5_H1_FP_GF_001

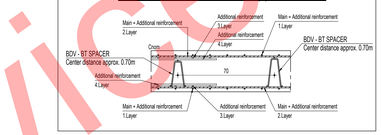
Abbreviation
V.S. - Vertical H.S. - Horizontal starter
Add. - Additional reinforcement
Stir. - Closed stirrup
C.J. - Construction joint

Legend:
Index cloud
Clarifying cloud

Note :
Please apply low-shrinkage, slow-hardening for Waterproof (WP) concrete in construction

MATERIALS/COMPONENTS
Reinforced concrete
Non-reinforced concrete
Prefabricated elements
Construction joint
Masonry
Non-load-bearing walls
Upnsing R.C. Components

Typical detail
Main reinforcement and support trestles



If necessary, requirements are shown separately on the components
Full surface protection system OS8 with accompanying crack treatment (design principle c)
The missing, more precise or deviating details of the exposure classes and concrete grades can be found in the structural analysis.
Reinforcing steel: B500 (meshes and bars)

Component	Concrete	inner / top: Ø Exposure classes	inner / top: Concrete cover [mm]	outer / bottom: Ø Exposure classes	outer / bottom: Concrete cover [mm]	Features
Ground and top floors						
Parapet	C30/37 WP	XC4, WF	40	-	-	top + sides
Slabs: WP-Roof	C30/37 WP	XC4, WF	40	XC1,W0	25	
Slabs: Upper floor slab	C30/37	XC1,W0	25	XC1,W0	25	4th floor partial roof terrace in XC3 (see statics items)
Slabs: Ground floor slab	C30/37	XC1,W0	25	XC1,W0	25	Inner courtyard ceiling in WP (see position plan)
Single-skin outer wall	C30/37	XC1,W0	25	XC1, W0	25	
Inner component	C30/37	XC1, W0	25	XC1, W0	25	
Stairs	C30/37	XC1,W0	20	XC1,W0	20	Prefabricated elements
Canopy / Balcony / Loggia	C30/37	XC4, XF1, WF	35	XC3, WF	35	Prefabricated elements
Wall-type beams/ Interception beams	≤ C50/60	see statics and position plan				Interception 1.FL and GF
Basement						
Cellar: Slab + Beams	C35/45	XC1, W0	25	XC1, W0	25	
Cellar: Inner component	C35/45	XC1, W0	25	XC1, W0	25	In some areas C50/60
Cellar: Outer walls	C30/37 WP	XC1, W0	25	XC3, WF	35	
Cellar: Stairs	C30/37	XC1,W0	25	XC1,W0	25	Prefabricated elements
Cellar: Ramp	C35/45	XC3, XD1, XM1 WA	35	XC1,W0	25	no WP, waterproofing on top + mastic asphalt
Parking: Inner Component	C35/45	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base In some areas C50/60
Parking: Outer walls	C30/37 WP	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base
Foundation						
Bottom plate (Cellar)	C35/45 WP	XC1, W0	25	XC2, WF	35	By area Fresh concrete composite foil
Bottom plate (Parking)	C35/45 WP	XC3, XD1, XM1 WA	55	XC2, WF	35	Top-side coating OS 8 (full surface)

The dimensions and quantities of the reinforcement forms must be checked by the contractor before the start of construction. Some of the reinforcement shapes must be cut locally.

Bending of reinforcing steel

According to DBV data sheet "Concrete cover and reinforcement"

When determining the bending roll diameter D min, DIN EN 1992-1-1/NA Table 8.1EN must be observed and a distinction made according to the structural function of the bend.

Minimum bending roll diameters for inclined bars or other bent bars

Minimum values of the concrete cover at right angles to the plane of curvature	Bending roll diameter D [mm]
> 100 mm und > 7 ø	D min = 10 ø
> 50 mm und > 3 ø	D min = 15 ø
≤ 50 mm oder ≤ 3 ø	D min = 20 ø

Minimum bending roll diameters for hooks, angled hooks, loops and stirrup

Bar diameter ø	Bending roll diameter D [mm]
< 20	D min = 4 ø
≥ 20	D min = 7 ø

The required bending roll diameter must always be specified on the bending form in the reinforcement plan and on the bending list for production and checking.

If no bending roll diameter is specified on the bending form either in the reinforcement schedule or on the bending list, D min is to be taken from the above table.

For reinforcing steel meshes and welded reinforcement that are bent after welding, DIN EN 1992-1-1, Table NA.8.1EN.5 must also be observed. The minimum values of the bending roll diameters listed above only apply if a > 4 ø (a=distance of the weld from the start of the bend).

Spacer Type and installation according to DBV leaflet "Spacers" and "Concrete cover and reinforcement"

Securing the top reinforcement

according to DBV data sheet "Supports"

For component thicknesses up to approx. 50 cm, the DBV data sheet specifies the requirements for the supports and regulates their application.

The following loads Fd are permissible for supports certified in accordance with the DBV data sheet:
Linear support:
p zul = 0.67 kN/m

Maximum laying distance

Bar diameter ø of the top reinforcement	Linear supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

Laying distance for linear supports: s is center-to-center dimension

Point supports:
p zul = 0.50 kN/Tressle

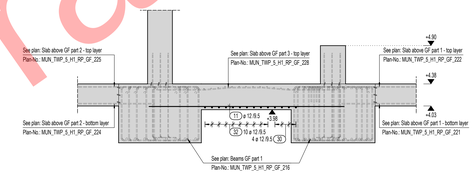
Maximum laying distance

Bar diameter ø of the top reinforcement	Point supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

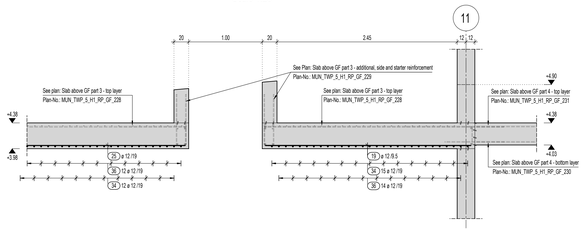
Laying distance for point supports: s applies in both directions

Plan basics
Implementation planning by B99 Architect BDA as of 01.02.2023

Section a-a
Scale 1:25



Section b-b
Scale 1:25



Section c-c
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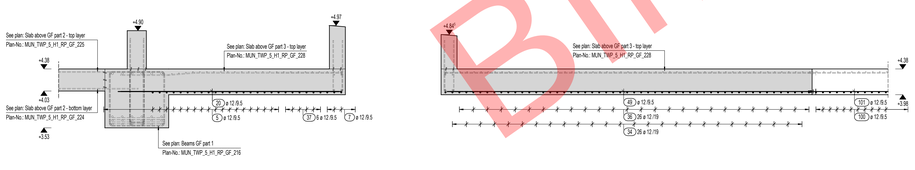
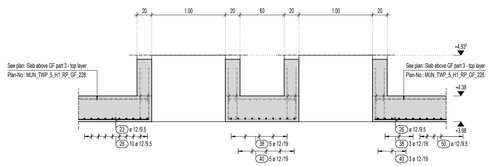


Section d-d
Scale 1:25



Section e-e
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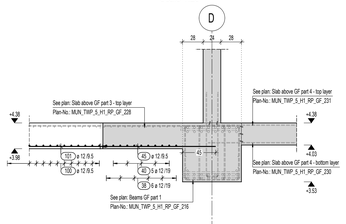


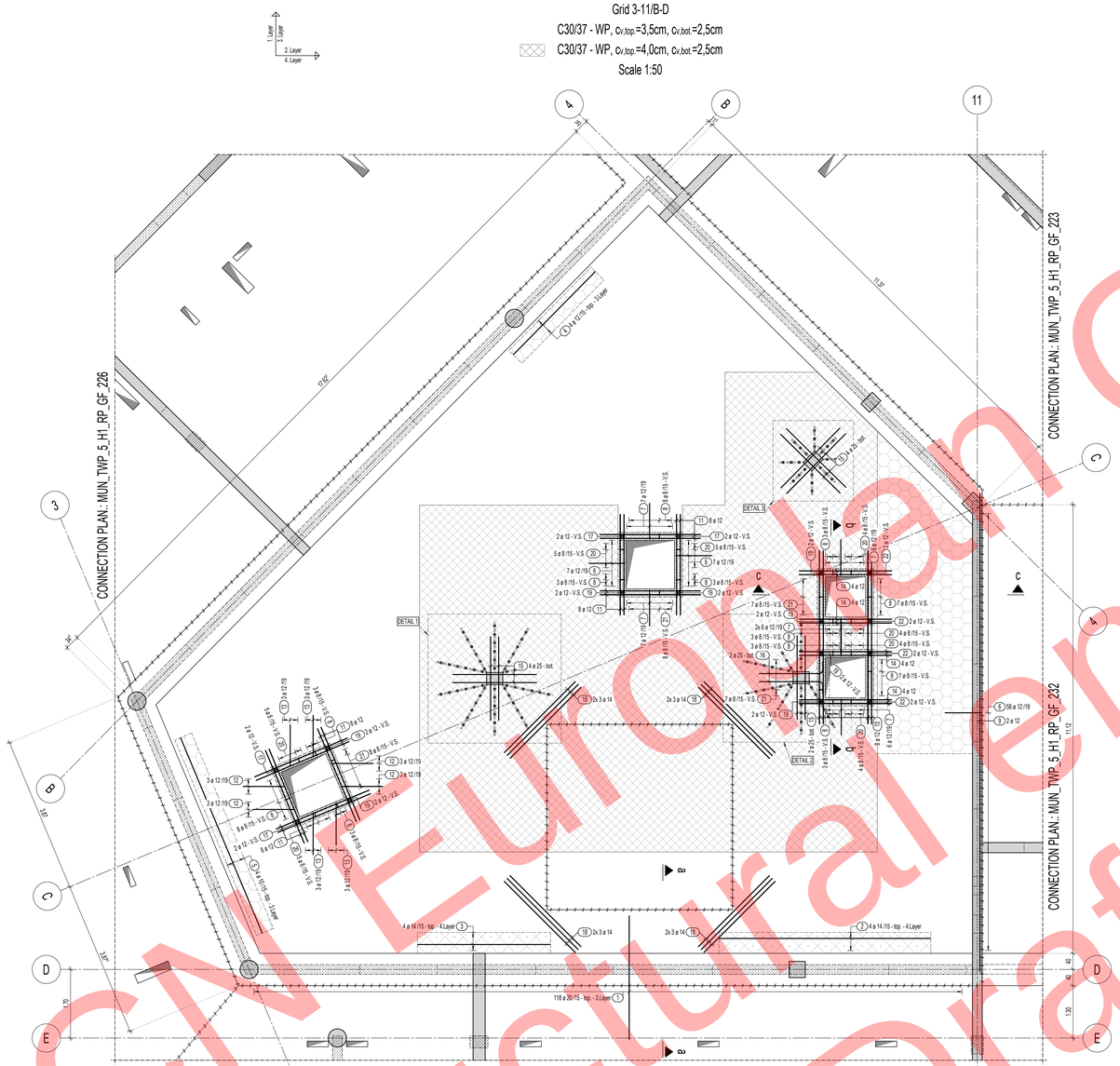
Slab above GF part 3 - additional, side and starter reinforcement

Grid 3-11/B-D

C30/37 - WP, $c_{v,top}$=3,5cm, $c_{v,bot}$=2,5cm

C30/37 - WP, $c_{v,top}$=4,0cm, $c_{v,bot}$=2,5cm

Scale 1:50



OVERLAPPING LENGTH OF WALLS AND COLUMNS REINFORCEMENT

Ø	α_6	C30/37 Compression $l_0/l_{0c} \geq$	C30/37 Tension $l_0 \geq$
[mm]	[-]	[cm]	[cm]
6	1,4	25	35
8		30	45
10		40	60
12		45	65
14		55	80
16	2,0	60	120
20		75	150
25		90	180
28		105	210

C30/37 Ø	α_6	Bond conditions	$l_{0c} \geq$	$l_0 \geq$	$1,3\ l_0 \geq$
[mm]	[-]	[-]	[cm]	[cm]	[cm]
8	1.0	Good	30	30	40
8	1.0	Poor	45	45	55
10	1.0	Good	40	40	50
10	1.0	Poor	55	55	70
12	1.4	Good	45	65	80
12	1.4	Poor	65	90	115
14	1.4	Good	55	75	95
14	1.4	Poor	75	105	135
16	2.0	Good	60	115	150
16	2.0	Poor	85	165	215
20	2.0	Good	75	145	190
20	2.0	Poor	105	205	270
25	2.0	Good	90	180	235
25	2.0	Poor	130	260	335
28	2.0	Good	105	205	265
28	2.0	Poor	145	290	375

Related plans:

Reinforcement plan No.:
MUN_TWP_5_H1_RP_GF_216
MUN_TWP_5_H1_RP_GF_227
MUN_TWP_5_H1_RP_GF_228
MUN_TWP_5_H1_RP_GF_230
MUN_TWP_5_H1_RP_GF_231
MUN_TWP_5_H1_RP_GF_232

Formwork plan No.:
MUN_TWP_5_H1_FP_GF_001

Abbreviation
V.S. - Vertical H.S. - Horizontal starter
Add. - Additional reinforcement
Stir. - Closed stirrup
C.J. - Construction joint

Note :
Please apply low-shrinkage, slow-hardening for Waterproof (WP) concrete in construction

Legend:
Index cloud
Clarifying cloud

MATERIALS/COMPONENTS
Reinforced concrete
Non-reinforced concrete
Prefabricated elements
Construction joint
Masonry
Non-load-bearing walls
Uprising RC. Components

BDV - BT SPACER
(DISTRIBUTION S ≤ 70 cm)

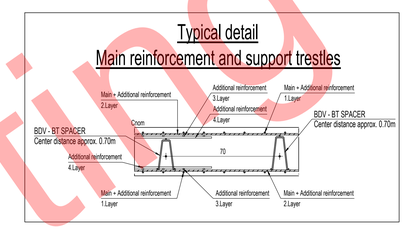
H = 35 cm
78 PIECES DBV-BT-21-B-L, MASS = 142.66 kg
H = 35 cm
14 PIECES DBV-BT-23-B-L, MASS = 27.05 kg
H = 35 cm
90 PIECES DBV-BT-24-B-L, MASS = 178.65 kg

THE HEIGHTS OF THE SPACER BLOCKS MUST BE CHECKED ON SITE!

CUT THE MATS LOCALLY IN THE AREA OF THE CUT-OUTS!

ROUGHING CONSTRUCTION JOINTS

Typical detail
Main reinforcement and support trestles



Bar schedule - bending shapes

Mark.	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	118	20	3.09	70 / 110 / 80	364.62	899.15
2	4	14	5.25	525	21.00	25.37
3	4	14	3.30	330	13.20	15.95
4	4	12	2.90	290	11.60	10.30
5	4	10	5.25	525	21.00	12.94
6	72	12	1.81	90 (top) / 35 / (bottom) / 55	130.32	115.72
7	38	12	1.84	65 (bottom) / 25 (top) / 90	69.92	62.09
8	54	8	1.63	75 / 171	88.02	34.77
9	2	12	11.85	1185	23.70	21.05
10	8	12	4.30	430	34.40	30.55
11	32	12	2.50	250	80.00	71.04
12	12	12	2.11	105 (top) / 35 / (bottom) / 80	25.32	22.48
13	12	12	2.14	105 (top) / 35 / (bottom) / 80	25.68	22.80
14	16	12	2.30	230	36.80	32.68
15	10	25	2.10	210	21.00	80.93
16	2	25	1.93	35 / 160	3.86	14.88
17	8	12	1.83	73 / 85	14.64	13.00
18	24	14	2.50	250	60.00	72.48
19	16	12	1.59	73 / 73	25.44	22.59
20	36	8	1.69	78 / 171	60.84	24.03
21	30	8	1.59	73 / 73	47.70	18.84
22	8	12	1.79	73 / 83	14.32	12.72

Total mass 1636.35

Component	Concrete	inner / top: Exposure classes	inner / top: Concrete cover [mm]	outer / bottom: Exposure classes	outer / bottom: Concrete cover [mm]	Features
Ground and top floors						
Parapet	C30/37 WP	XC4, WF	40	-	-	top + sides
Slabs: WP-Roof	C30/37 WP	XC4, WF	40	XC1,W0	25	
Slabs: Upper floor slab	C30/37	XC1,W0	25	XC1,W0	25	4th floor partial roof terrace in XC3 (see statics items)
Slabs: Ground floor slab	C30/37	XC1,W0	25	XC1,W0	25	Inner courtyard ceiling in WP (see position plan)
Single-skin outer wall	C30/37	XC1,W0	25	XC1, W0	25	
Inner component	C30/37	XC1, W0	25	XC1, W0	25	
Stairs	C30/37	XC1,W0	20	XC1,W0	20	Prefabricated elements
Canopy / Balcony / Loggia	C30/37	XC4, XF1, WF	35	XC3, WF	35	Prefabricated elements
Wall-type beams/ Interception beams	≤ C50/60	see statics and position plan				Interception 1.FL and GF
Basement						
Cellar: Slab + Beams	C35/45	XC1, W0	25	XC1, W0	25	
Cellar: Inner component	C35/45	XC1, W0	25	XC1, W0	25	In some areas C50/60
Cellar: Outer walls	C30/37 WP	XC1, W0	25	XC3, WF	35	
Cellar: Stairs	C30/37	XC1,W0	25	XC1,W0	25	Prefabricated elements
Parking: Ramp	C35/45	XC3, XD1, XM1 WA	35	XC1,W0	25	no WP; waterproofing on top + mastic asphalt
Parking: Inner Component	C35/45	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base. In some areas C50/60
Parking: Outer walls	C30/37 WP	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base
Foundation						
Bottom plate (Cellar)	C35/45 WP	XC1, W0	25 35	XC2, WF	35	By area Fresh concrete composite foil
Bottom plate (Parking)	C35/45 WP	XC3, XD1, XM1 WA	55	XC2, WF	35	Top-side coating OS 8 (full surface)

If necessary, requirements are shown separately on the components
Full surface protection system OS8 with accompanying crack treatment (design principle c)
The missing, more precise or deviating details of the exposure classes and concrete grades can be found in the structural analysis.
Reinforcing steel: B500 (meshes and bars)

The dimensions and quantities of the reinforcement forms must be checked by the contractor before the start of construction. Some of the reinforcement shapes must be cut locally.

Bending of reinforcing steel

According to DBV data sheet "Concrete cover and reinforcement"

When determining the bending roll diameter D min, DIN EN 1992-1-1/NA Table 8.1EN must be observed and a distinction made according to the structural function of the bend.

Minimum bending roll diameters for inclined bars or other bent bars

Minimum values of the concrete cover at right angles to the plane of curvature	Bending roll diameter D [mm]
> 100 mm und > 7 ø	D min = 10 ø
> 50 mm und > 3 ø	D min = 15 ø
≤ 50 mm oder ≤ 3 ø	D min = 20 ø

The required bending roll diameter must always be specified on the bending form in the reinforcement plan and on the bending list for production and checking.

For reinforcing steel meshes and welded reinforcement that are bent after welding, DIN EN 1992-1-1, Table NA.8.1EN b must also be observed. The minimum values of the bending roll diameters listed above only apply if a > 4 ø (=distance of the weld from the start of the bend).

Minimum bending roll diameters for hooks, angled hooks, loops and stirrup

Bar diameter ø	Bending roll diameter D [mm]
< 20	D min = 4 ø
≥ 20	D min = 7 ø

If no bending roll diameter is specified on the bending form either in the reinforcement schedule or on the bending list, D min is to be taken from the above table.

Spacer

Type and installation according to DBV leaflet "Spacers" and "Concrete cover and reinforcement"

Securing the top reinforcement

according to DBV data sheet "Supports"

For component thicknesses up to approx. 50 cm, the DBV data sheet specifies the requirements for the supports and regulates their application.
The following loads Fvd are permissible for supports certified in accordance with the DBV data sheet:

Linear supports
p zul = 0.67 kN/m

Maximum laying distance

Bar diameter ø of the top reinforcement	Linear supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

Laying distance for linear supports: s is center-to-center dimension

Point supports
p zul = 0.50 kN/Trestle

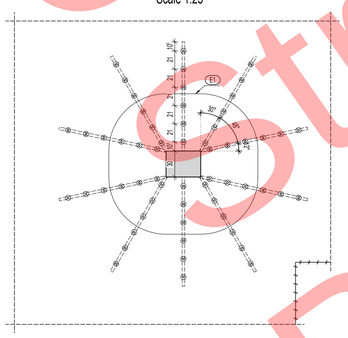
Maximum laying distance

Bar diameter ø of the top reinforcement	Point supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

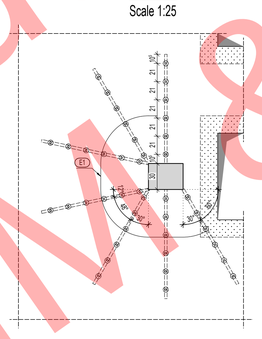
Laying distance for point supports: s applies in both directions

Plan basics
Implementation planning by B99 Architect BDA as of 01.02.2023

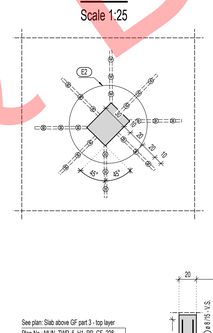
Detail 1
Scale 1:25



Detail 2
Scale 1:25

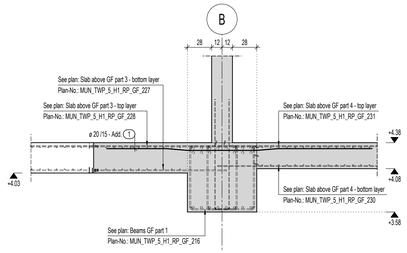


Detail 3
Scale 1:25

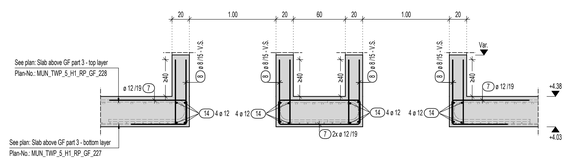


POS	HDB	PIECES
E1	HDB-20/295-6/1260 (105/210/4x210/105)	17
E2	HDB-16/295-3/600 (100/200/200/100)	8

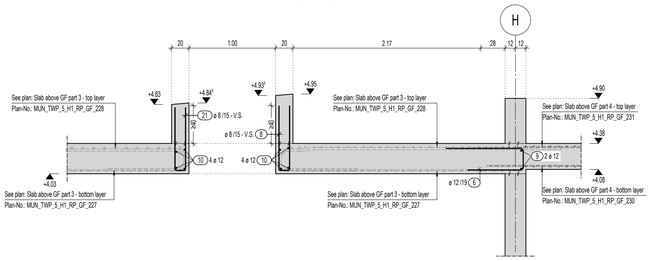
Section a-a
Scale 1:25



Section b-b
Scale 1:25



Section c-c
Scale 1:25



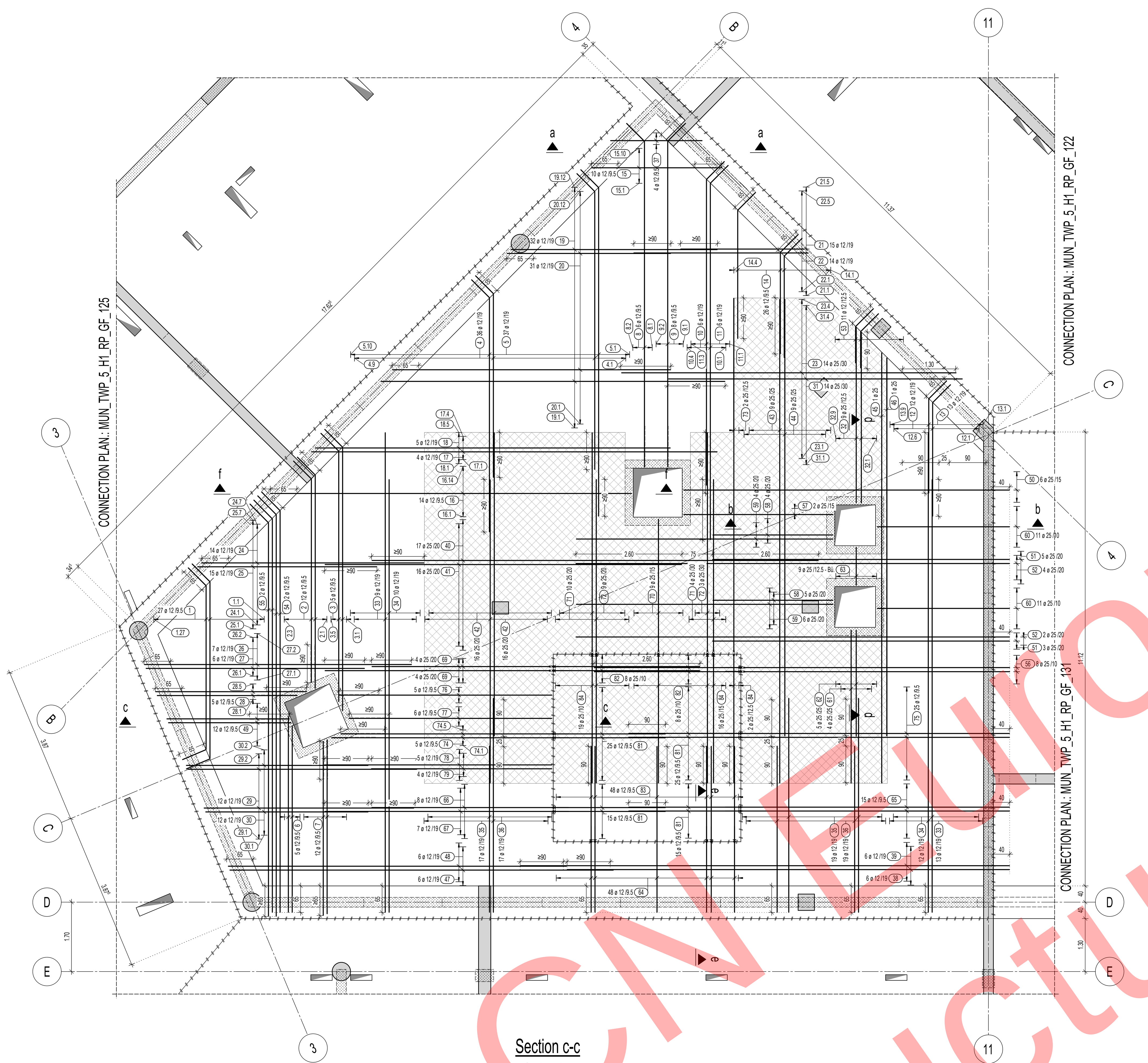
Slab above GF part 3 - top layer

Grid 3-11/B-D

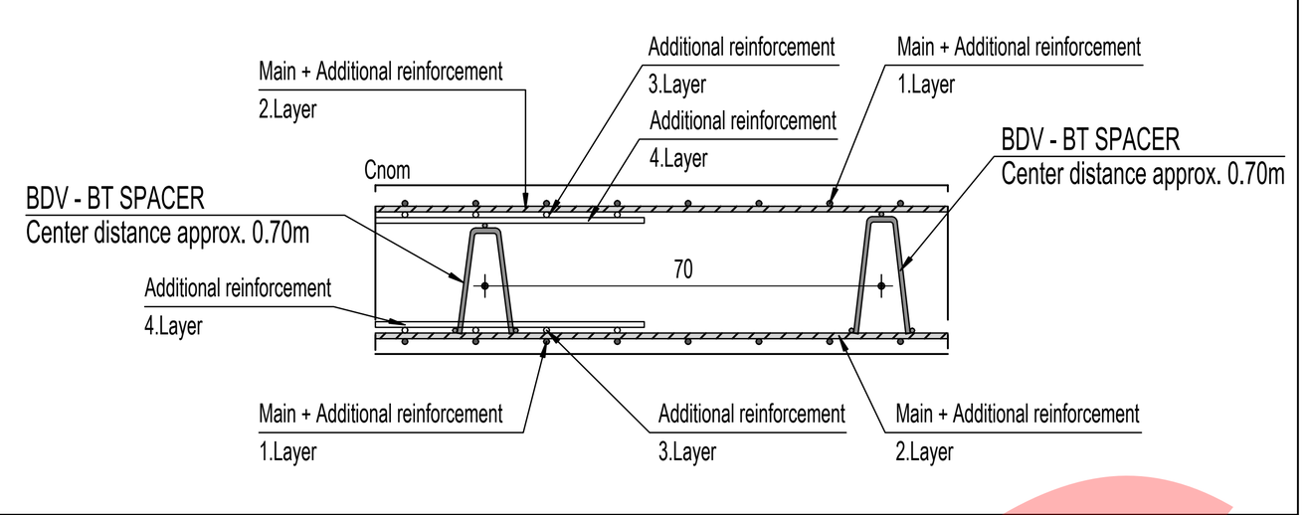
C30/37 - WP, $c_{v,top}$ =3,5cm, $c_{v,bot}$ =2,5cm

C30/37 - WP, $c_{v,top}$ =4,0cm, $c_{v,bot}$ =2,5cm

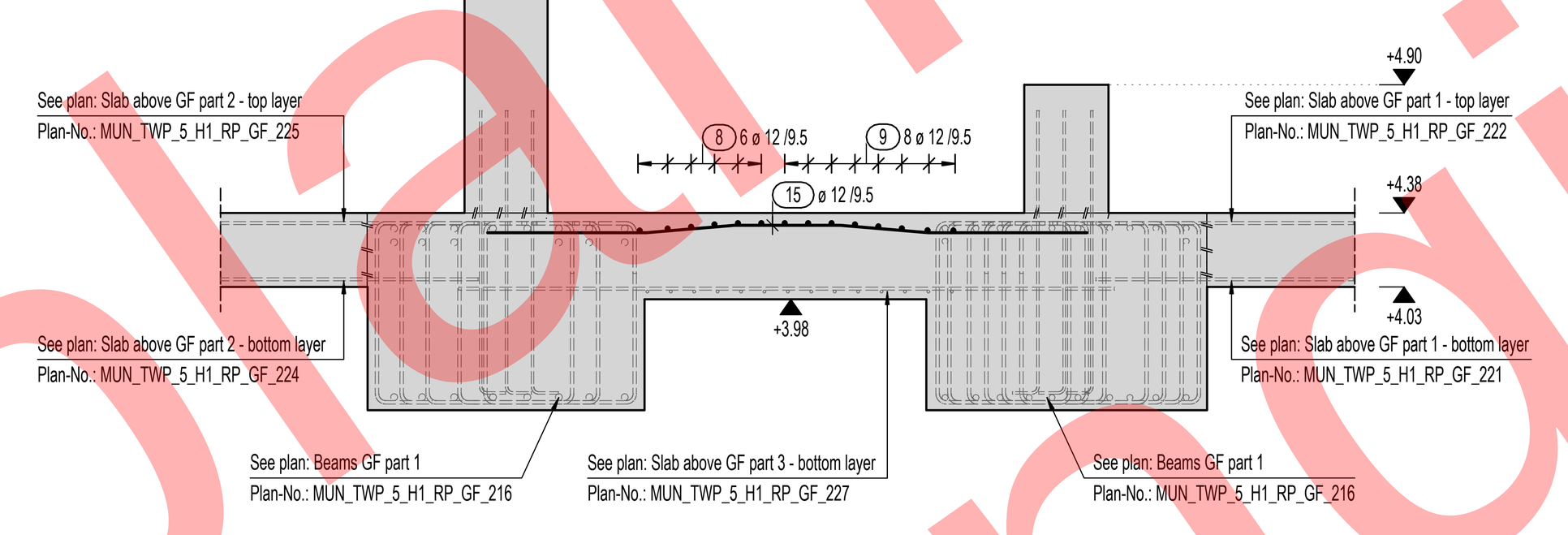
Scale 1:50



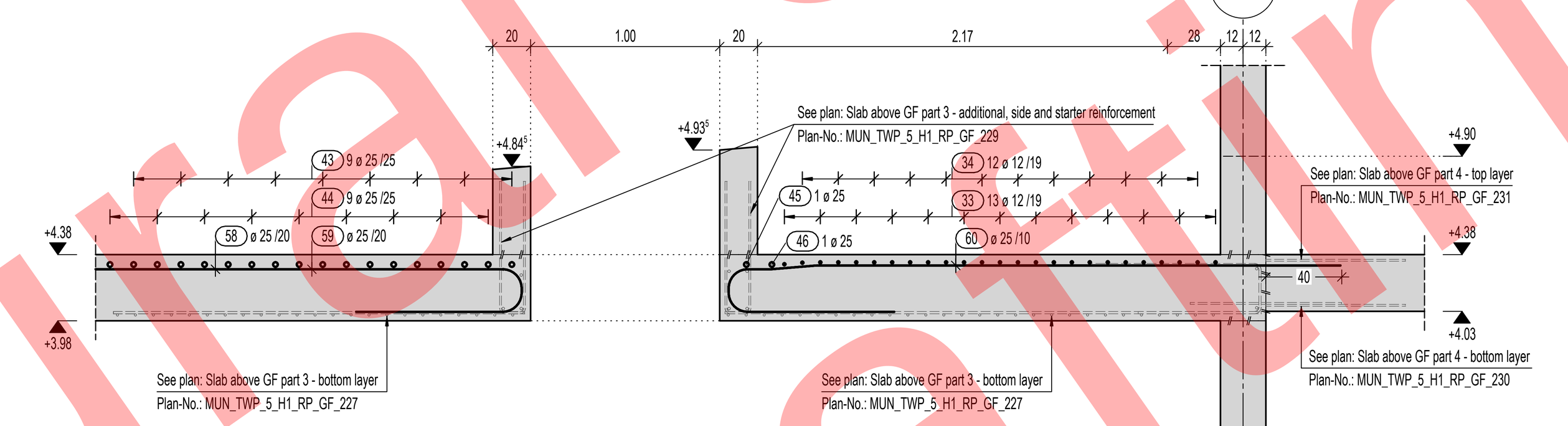
Typical detail
Main reinforcement and support trestles



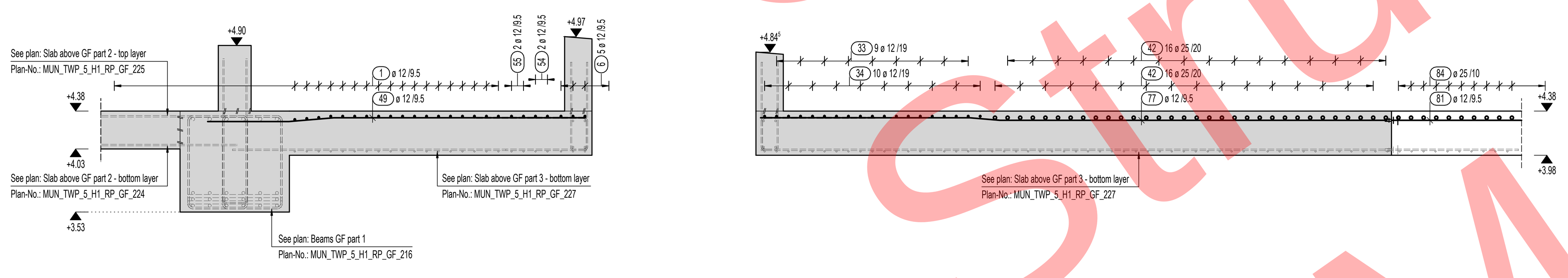
Section a-a
Scale 1:25



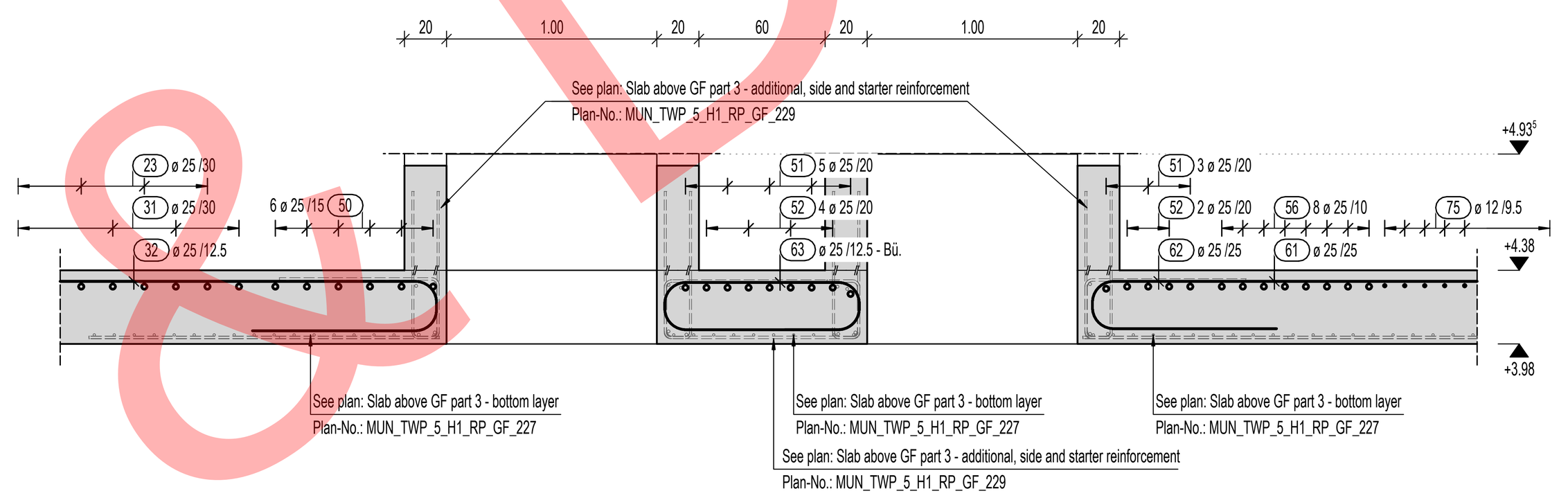
Section b-b
Scale 1:25



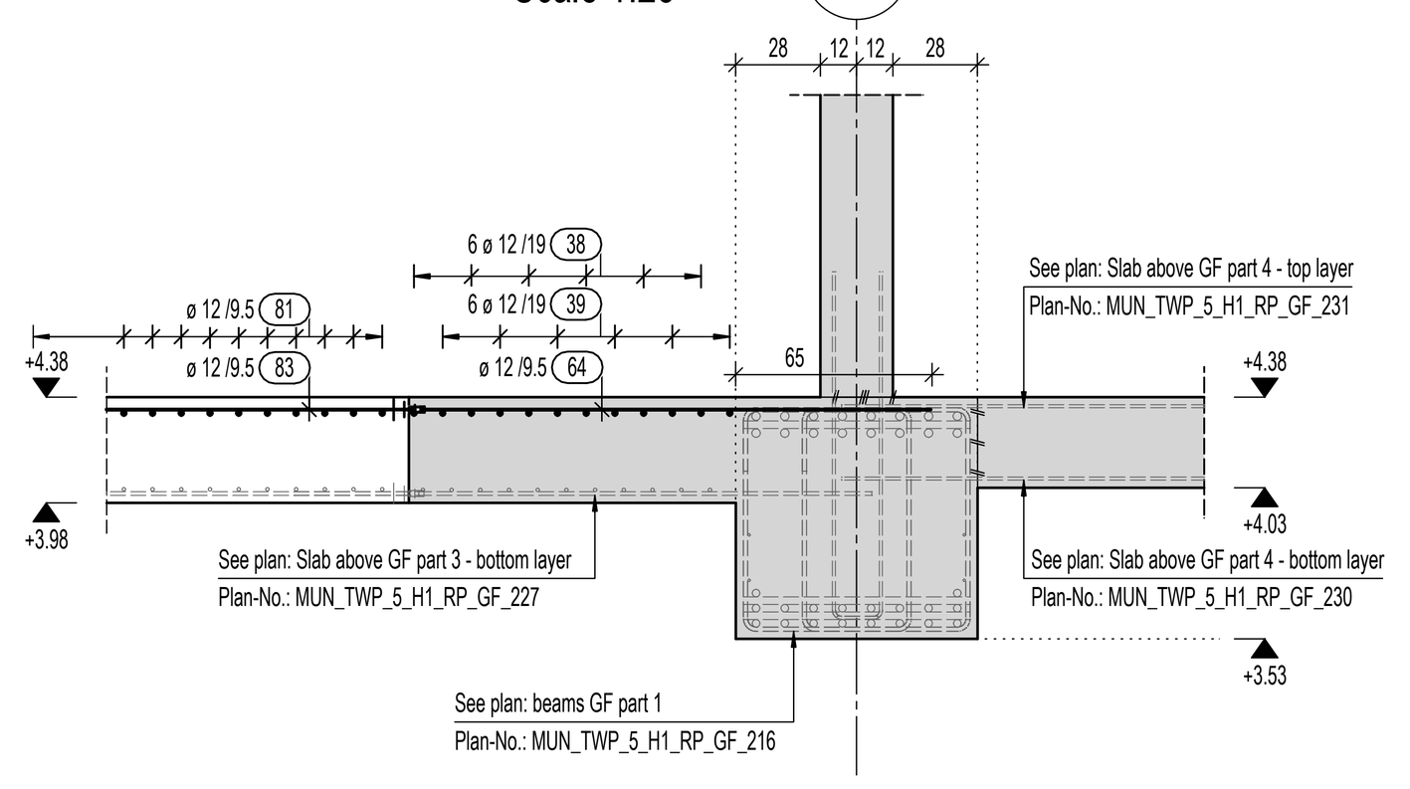
Section c-c
Scale 1:25



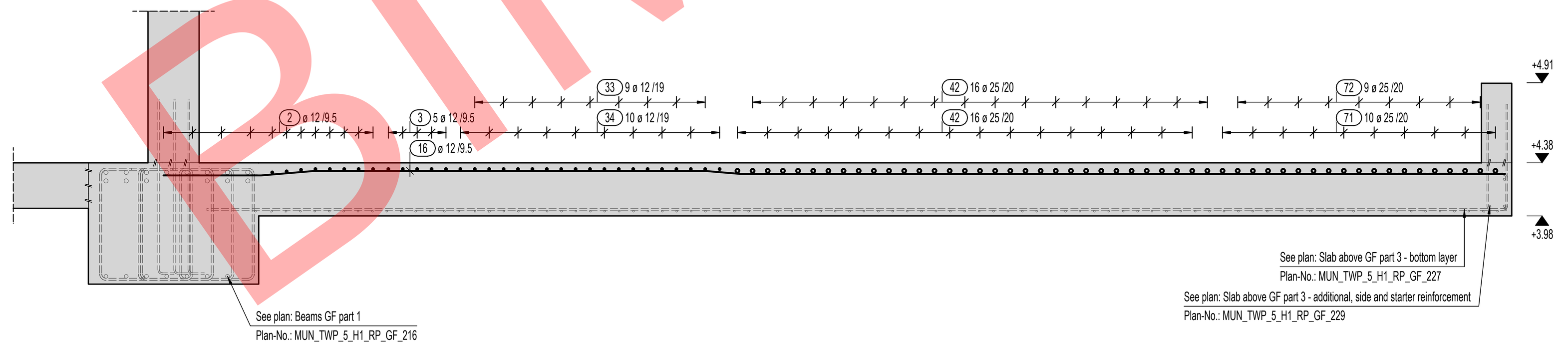
Section d-d
Scale 1:25



Section e-e
Scale 1:25



Section f-f
Scale 1:25



C30/37					
Ø	α_6	Bond conditions	l_{bd} ≥	l_0 ≥	1,3 l_0 ≥
[mm]	[-]	[-]	[cm]	[cm]	[cm]
8	1.0	Good	30	30	40
8	1.0	Poor	45	45	55
10	1.0	Good	40	40	50
10	1.0	Poor	55	55	70
12	1.4	Good	45	65	80
12	1.4	Poor	65	90	115
14	1.4	Good	55	75	95
14	1.4	Poor	75	105	135
16	2.0	Good	60	115	150
16	2.0	Poor	85	165	215
20	2.0	Good	75	145	190
20	2.0	Poor	105	205	270
25	2.0	Good	90	180	235
25	2.0	Poor	130	260	335
28	2.0	Good	105	205	265
28	2.0	Poor	145	290	375

Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	27	12	-X-		161.19	143.14
2	12	12	-X-		67.76	60.17
3	5	12	-X-		33.98	30.17
4	36	12	-X-		185.76	164.95
5	37	12	-X-		232.74	206.67
6	5	12	-X-		22.91	20.34
7	12	12	-X-		51.24	45.50
8	6	12	-X-		50.97	45.26
9	8	12	-X-		67.60	60.03
10	6	12	-X-		54.79	48.65
11	6	12	-X-		47.36	42.06
12	12	12	-X-		43.58	38.70
13	13	12	-X-		32.46	28.82
14	26	12	-X-		75.16	66.74
15	10	12	-X-		31.15	27.66
16	14	12	-X-		123.48	109.65
17	4	12	-X-		39.46	35.04
18	5	12	-X-		43.57	38.69
19	32	12	-X-		213.39	189.49
20	31	12	-X-		171.27	152.09
21	15	12	-X-		45.57	40.47
22	14	12	-X-		58.82	52.23
23	14	25	-X-		116.95	450.73
24	14	12	-X-		77.59	68.90
25	15	12	-X-		66.03	58.63
26	7	12	-X-		46.64	41.42

Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
27	6	12	-X-		32.88	29.20
28	5	12	-X-		18.53	16.45
29	12	12	-X-		64.62	57.38
30	12	12	-X-		50.70	45.02
31	14	25	-X-		102.97	396.85
32	9	25	-X-		49.38	190.31
33	22	12	11.76	1176	258.72	229.74
34	22	12	10.61	1061	233.42	207.28
35	36	12	5.25	525	189.00	167.83
36	36	12	4.08	408	146.88	130.43
37	4	12	2.25	225	9.00	7.99
38	6	12	12.00	1200	72.00	63.94
39	6	12	10.85	1085	65.10	57.81
40	17	25	10.96	1096	186.32	718.08
41	16	25	8.76	876	140.16	540.18
42	32	25	7.45	745	238.40	918.79
43	9	25	11.87	1187	106.83	411.72
44	9	25	10.72	1072	96.48	371.83
45	1	25	10.56	1056	10.56	40.70
46	1	25	9.28	928	9.28	35.77
47	6	12	8.30		49.80	44.22
48	6	12	9.41		56.46	50.14
49	12	12	3.01		36.12	32.07
50	6	25	8.01		48.06	185.22
51	8	25	7.30		58.40	225.07
52	6	25	10.65		63.90	246.27
53	11	12	1.55		17.05	15.14
54	2	12	10.50		21.00	18.65
55	2	12	10.30		20.60	18.29
56	8	25	6.55		52.40	201.95

Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
57	2	25	4.83		9.66	37.23
58	9	25	4.11		36.99	142.56
59	10	25	7.46		74.60	287.51
60	22	25	4.41		97.02	373.92
61	4	25	4.92		19.68	75.85
62	5	25	3.77		18.85	72.65
63	9	25	3.41		30.69	118.28
64	48	12	1.70		81.60	72.46
65	15	12	6.56		98.40	87.38
66	8	12	4.42		35.36	31.40
67	7	12	5.57		38.99	34.62
68	4	25	5.54		22.16	85.40
69	4	25	4.39		17.56	67.68
70	9	25	3.26		29.34	113.08
71	14	25	4.23		59.22	228.23
72	12	25	5.38		64.56	248.81
73	2	25	8.67		17.34	66.83
74	5	12	-X-		27.04	24.01
75	25	12	6.56		164.00	145.63
76	5	12	5.22		26.10	23.18
77	6	12	4.98		29.88	26.53
78	5	12	5.58		27.90	24.78
79	4	12	4.43		17.72	15.74
81	80	12	2.75		220.00	195.36
82	16	25	3.60		57.60	221.99
83	48	12	2.34		112.32	99.74
84	37	25	3.17		117.29	452.04

Total mass 11313.42

Related plans:

Reinforcement plan No.:
MUN_TWP_5_H1_RP_GF_216
MUN_TWP_5_H1_RP_GF_227
MUN_TWP_5_H1_RP_GF_229
MUN_TWP_5_H1_RP_GF_230
MUN_TWP_5_H1_RP_GF_231
MUN_TWP_5_H1_RP_GF_232

Formwork plan No.:
MUN_TWP_5_H1_FP_GF_001

Abbreviation

V.S. - Vertical H.S. - Horizontal starter
Add. - Additional reinforcement
Stir. - Closed stirrup
C.J. - Construction joint

Legend:
Index cloud
Clarifying cloud

Note :
Please apply low-shrinkage, slow-hardening for Waterproof (WP) concrete in construction

MATERIALS/COMPONENTS

Reinforced concrete | Mansory
Non-reinforced concrete | Non-load-bearing walls
Prefabricated elements | Uprising RC. Components
Construction joint

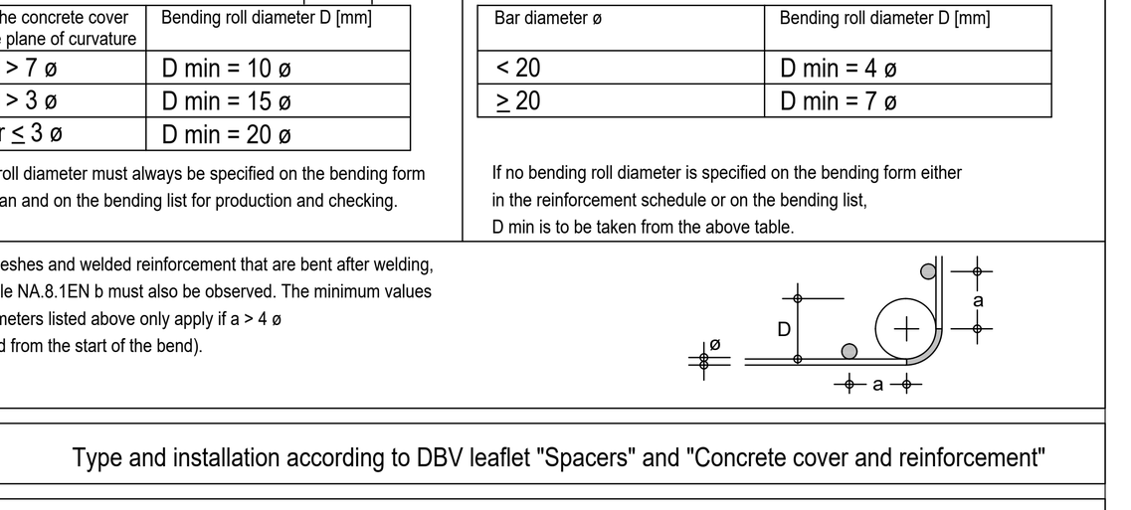
Component		Concrete	inner / top: Exposure classes	Concrete cover [mm]	outer / bottom: Exposure classes	Concrete cover [mm]	Features
Ground and top floors							
Parapet		C30/37 WP	XC4, WF	40	-	-	top + sides
Slabs	WP-Roof	C30/37 WP	XC4, WF	40	XC1,W0	25	
Slabs	Upper floor slab	C30/37	XC1,W0	25	XC1,W0	25	4th floor partial roof terrace in XC3 (see statics items)
Slabs	Ground floor slab	C30/37	XC1,W0	25	XC1,W0	25	Inner courtyard ceiling in WP (see position plan)
Single-skin outer wall		C30/37	XC1,W0	25	XC1, W0	25	
Inner component		C30/37	XC1, W0	25	XC1, W0	25	
Stairs		C30/37	XC1,W0	20	XC1,W0	20	Prefabricated elements
Canopy / Balcony / Loggia		C30/37	XC4, XF1, WF	35	XC3, WF	35	Prefabricated elements
Wall-type beams/ Interception beams		≤ C50/60	see statics and position plan				Interception 1.FL and GF
Basement							
Cellar	Slab + Beams	C35/45	XC1, W0	25	XC1, W0	25	
Cellar	Inner component	C35/45	XC1, W0	25	XC1, W0	25	In some areas C50/60
Cellar	Outer walls	C30/37 WP	XC1, W0	25	XC3, WF	35	
Cellar	Stairs	C30/37	XC1,W0	25	XC1,W0	25	Prefabricated elements
Parking	Ramp	C35/45	XC3, XD1, XM1 WA	35	XC1,W0	25	no WP, waterproofing on top + mastic asphalt
Parking	Inner Component	C35/45	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base. In some areas C50/60
Parking	Outer walls	C30/37 WP	XC3, WF	35	XC3, WF	35	OS 5b coating on the inside 50cm up the base
Foundation							
Bottom plate (Cellar)		C35/45 WP	XC1, W0	25 35	XC2, WF	35	By area Fresh concrete composite foil
Bottom plate (Parking)		C35/45 WP	XC3, XD1, XM1 WA	55	XC2, WF	35	Top-side coating OS 8 (full surface)

If necessary, requirements are shown separately on the components
Full surface protection system OS8 with accompanying crack treatment (design principle c)
The missing, more precise or deviating details of the exposure classes and concrete grades can be found in the structural analysis.
Reinforcing steel: B500 (meshes and bars)

The dimensions and quantities of the reinforcement forms must be checked by the contractor before the start of construction. Some of the reinforcement shapes must be cut locally.

Bending of reinforcing steel
According to DBV data sheet "Concrete cover and reinforcement"

When determining the bending roll diameter D min, DIN EN 1992-1-1/NA Table 8.1EN must be observed and a distinction made according to the structural function of the bend:



Minimum bending roll diameters for inclined bars or other bent bars

Minimum values of the concrete cover at right angles to the plane of curvature	Bending roll diameter D [mm]
> 100 mm und > 7 ø	D min = 10 ø
> 50 mm und > 3 ø	D min = 15 ø
≤ 50 mm oder ≤ 3 ø	D min = 20 ø

The required bending roll diameter must always be specified on the bending form in the reinforcement plan and on the bending list for production and checking.

Minimum bending roll diameters for hooks, angled hooks, loops and stirrup

Bar diameter ø	Bending roll diameter D [mm]
< 20	D min = 4 ø
≥ 20	D min = 7 ø

If no bending roll diameter is specified on the bending form either in the reinforcement schedule or on the bending list, D min is to be taken from the above table.

For reinforcing steel meshes and welded reinforcement that are bent after welding, DIN EN 1992-1-1, Table NA.8.1EN b must also be observed. The minimum values of the bending roll diameters listed above only apply if a > 4 ø (a=distance of the weld from the start of the bend).

Spacer
Type and installation according to DBV leaflet "Spacers" and "Concrete cover and reinforcement"

Securing the top reinforcement
according to DBV data sheet "Supports"

For component thicknesses up to approx. 50 cm, the DBV data sheet specifies the requirements for the supports and regulates their application.
The following loads Frd are permissible for supports certified in accordance with the DBV data sheet:

Linear supports
p zul = 0.67 kN/m
Maximum laying distance

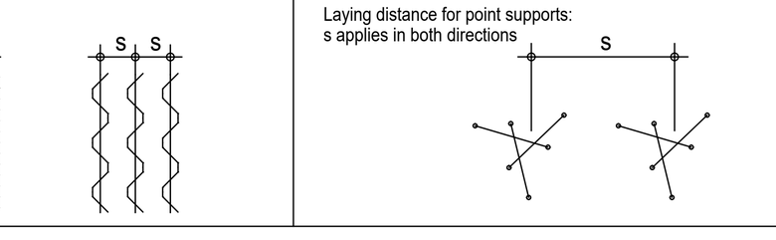
Bar diameter ø of the top reinforcement	Linear supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

Laying distance for linear supports: s is center-to-center dimension

Point supports
p zul = 0.50 kN/Trestle
Maximum laying distance

Bar diameter ø of the top reinforcement	Point supports
≤ 6.5 mm	s = 50 cm
6.5 mm < ø ≤12 mm	s = 70 cm
ø > 12 mm	s = 70 cm

Laying distance for point supports: s applies in both directions



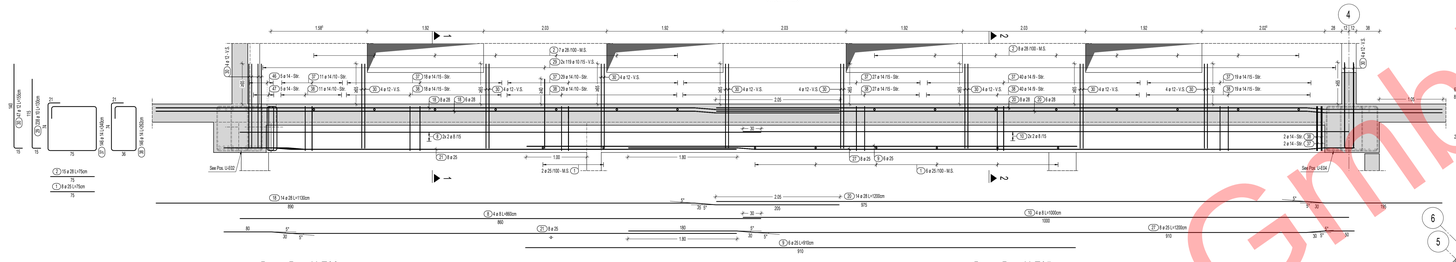
Plan basics
Implementation planning by B99 Architect BDA as of 01.02.2023

Beam Pos. U-E01

Grid 3-4/B Rough joint

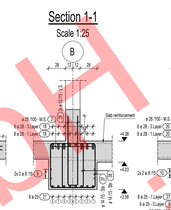
b/h=80/80cm, C30/37, $c_{v,top}$= 3,5cm, $c_{v,bottom}$=2,5cm

Scale 1:25



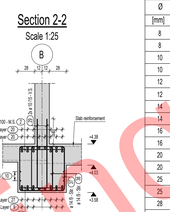
Section 1-1

Scale 1:25



Section 2-2

Scale 1:25



C30/37					
Ø	c_v	Bond conditions	$l_1 \geq$	$l_2 \geq$	$1,3\,l_1 \geq$
[mm]	[-]	[-]	[cm]	[cm]	[cm]
8	1.0	Good	30	30	40
8	1.0	Poor	45	45	55
10	1.0	Good	40	40	50
10	1.0	Poor	55	55	70
12	1.4	Good	45	65	80
12	1.4	Poor	65	90	115
14	1.4	Good	55	75	95
14	1.4	Poor	75	105	135
16	2.0	Good	60	115	150
16	2.0	Poor	85	165	215
20	2.0	Good	75	145	190
20	2.0	Poor	105	205	270
25	2.0	Good	90	180	235
25	2.0	Poor	130	260	335
28	2.0	Good	105	205	265
28	2.0	Poor	145	290	375

Related plans:

Reinforcement plan No.:

Formwork plan No.: MUN_TMF_E_01_FP_GF_001

Abbreviation

V.S. - Vertical H.S. - Horizontal starter

Add. - Additional reinforcement

Str. - Closed stirrup

C.J. - Construction joint

Note:

Please apply low-shrinkage, slow-hardening for Waterproof (WP) concrete in construction

Legend:

Index cloud

Clarifying cloud

MATERIALS/COMPONENTS

Reinforced concrete

Non-reinforced concrete

Prefabricated elements

Construction joint

Masonry

Non-load-bearing walls

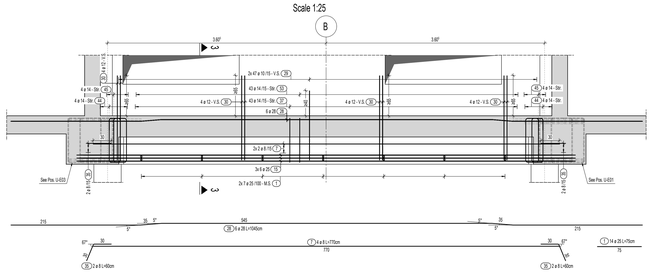
Uprising RC. Components

Beam Pos. U-E02

Grid B-D/3 Rough joint

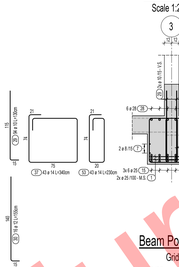
b/h=80/80cm, C30/37, $c_{v,top}$= 3,5cm, $c_{v,bottom}$=2,5cm

Scale 1:25



Section 3-3

Scale 1:25

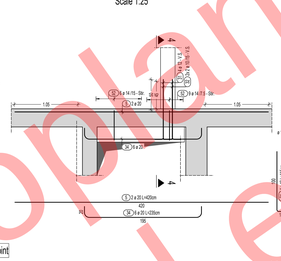


Beam Pos. U-E05

Grid A-B/6 Rough joint

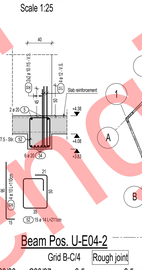
b/h=40/55, C50/60, c_v=2,5cm

Scale 1:25



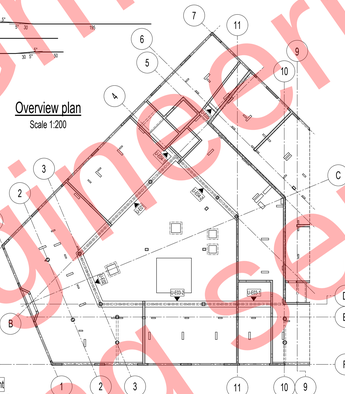
Section 4-4

Scale 1:25



Overview plan

Scale 1:200

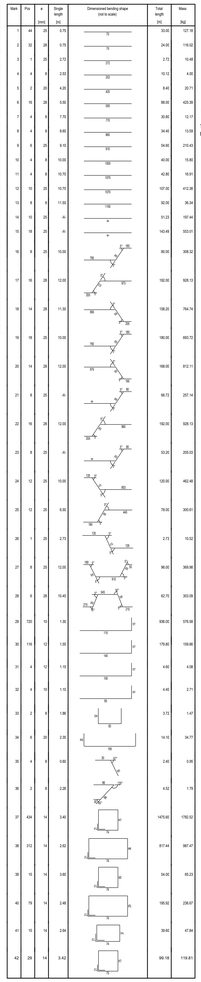


OVERLAPPING LENGTH OF WALLS AND COLUMNS REINFORCEMENT

Ø	c_v	C30/37		C50/60	
		Compression	Tension	Compression	Tension
		$l_1 \geq$	$l_2 \geq$	$l_1 \geq$	$l_2 \geq$
[mm]	[-]	[cm]	[cm]	[cm]	[cm]
6	2.0	25	35	20	30
8		30	45	25	35
10	1.4	40	60	30	45
12		45	65	35	50
14		55	80	40	60
16		60	120	45	90
20		75	150	55	110
25		90	180	65	130
28		105	210	75	150

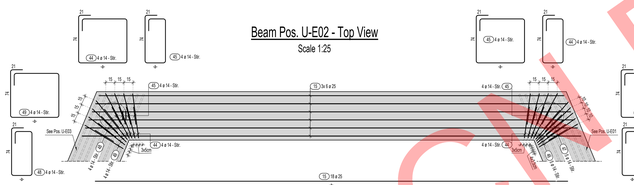
Bar schedule - bending shapes

Bar schedule - bending shapes



Beam Pos. U-E02 - Top View

Scale 1:25

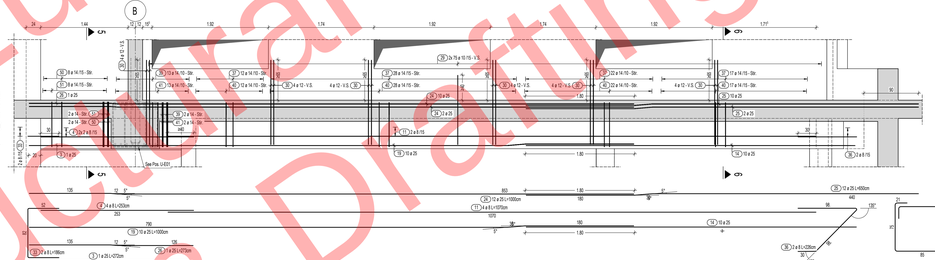


Beam Pos. U-E04-1

Grid A-B/4 Rough joint

b/h=90/80cm, C30/37, c_v=2,5cm

Scale 1:25

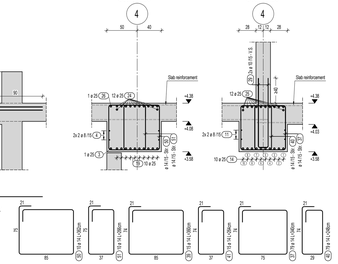


Beam Pos. U-E04-2

Grid B-C/4 Rough joint

b/h=80/80cm, C30/37, $c_{v,top}$= 3,5cm, $c_{v,bottom}$=2,5cm

Scale 1:25



Section 5-5

Scale 1:25

Section 6-6

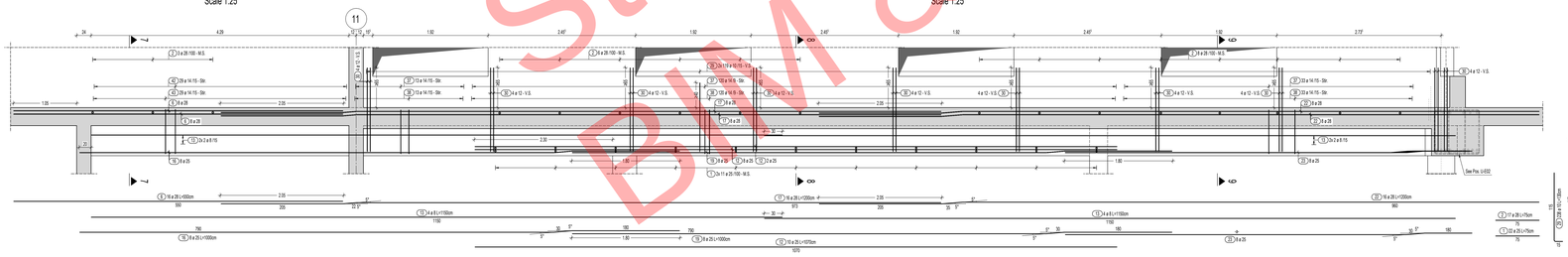
Scale 1:25

Beam Pos. U-E03-1

Grid 10-11/D Rough joint

b/h=80/80cm, C30/37, c=2,5cm

Scale 1:25

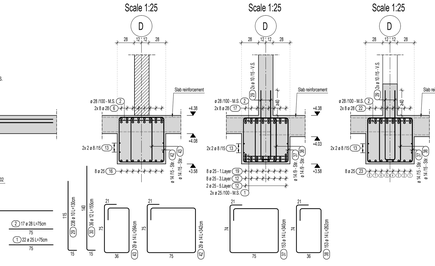


Beam Pos. U-E03-2

Grid 3-11/D Rough joint

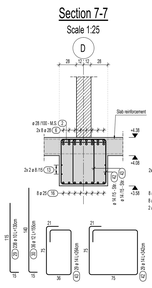
b/h=80/80cm, C30/37, $c_{v,top}$= 3,5cm, $c_{v,bottom}$=2,5cm

Scale 1:25



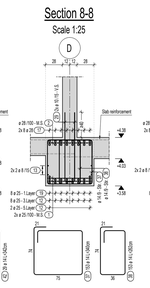
Section 7-7

Scale 1:25



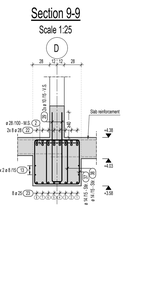
Section 8-8

Scale 1:25



Section 9-9

Scale 1:25



Component	Concrete	Inner / top		outer / bottom		Features
		Exposure classes	Concrete cover [mm]	Exposure classes	Concrete cover [mm]	
Ground and top floors						
Parapet	C30/37 WP	XC4, WF	40	-	-	top + sides
Roof	C30/37 WP	XC4, WF	40	XC1,WO	25	
Upper floor slab	C30/37	XC1,WO	25	XC1,WO	25	with floor partial roof terrace in XC3 (see statics forms)
Ground floor slab	C30/37	XC1,WO	25	XC1,WO	25	inner courtyard ceiling in WP (see position plan)
Single-skin outer wall	C30/37	XC1,WO	25	XC1,WO	25	
Inner component	C30/37	XC1, WO	25	XC1, WO	25	
Stairs	C30/37	XC1,WO	20	XC1,WO	20	Prefabricated elements
Canopy / Balcony / Loggia	C30/37	XC4, XF1, WF	35	XC3, WF	30	Prefabricated elements
Wall-type beams/ Intersection beams	≤ C50/60	see statics and position plan				Intersection 1.FL and GF
Basement						
Slab + Beams	C35/45	XC1, WO	25	XC1, WO	25	
Inner component	C35/45	XC1, WO	25	XC1, WO	25	in some areas C50/60
Outer walls	C30/37 WP	XC1, WO	25	XC3, WF	30	
Stairs	C30/37	XC1,WO	25	XC1,WO	25	Prefabricated elements
Ramp	C35/45	XC3, XD1, XM1 WA	30	XC3, WF	30	1st WP, waterproofing on top + mastic asphalt
Inner Component	C35/45	XC3, WF	35	XC3, WF	30	OS 5b coating on the inside 30cm up the base. (in some areas C50/60)
Outer walls	C30/37 WP	XC3, WF	35	XC3, WF	30	OS 5b coating on the inside 30cm up the base
Foundation						
Bottom plate (Cellar)	C35/45 WP	XC1, WO	25	XC2, WF	30	Sly area: Fresh concrete composite fol.
Bottom plate (Parking)	C35/45 WP	XC3, XD1, XM1 WA	55	XC2, WF	30	Tire-trade roadway OS 6 (full-surface)

If necessary, requirements are shown separately on the components

Full-surface protection system OS8 with accompanying crack treatment (design principle c)

The missing, more precise or deviating details of the exposure classes and concrete grades can be found in the structural analysis.

Reinforcing steel: B500 (meshes and bars)

The dimensions and quantities of the reinforcement forms must be checked by the contractor before the start of construction. Some of the reinforcement shapes must be cut locally.

Bending of reinforcing steel According to DBV data sheet "Concrete cover and reinforcement"

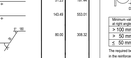
When determining the bending roll diameter D min, DIN EN 1992-1-1/NA Table 8.1DE must be observed and a distinction made according to the structural function of the bar.

Minimum bending roll diameters for inclined bars or other bent bars

Minimum values of the concrete cover at right angles to the plane of curvature	Bending roll diameter D [mm]
≤ 100 mm und > 2 ø	D min = 10 ø
> 100 mm und > 2 ø	D min = 15 ø
≤ 100 mm oder ≤ 2 ø	D min = 20 ø

The required bending roll diameter must always be specified on the bending form in the reinforcement plan and on the bending list for production and checking.

Minimum bending roll diameters for hooks, angled hooks, loops and stirrup



Bar diameter ø	Bending roll diameter D [mm]
< 20	D min = 4 ø
≥ 20	D min = 7 ø

If no bending roll diameter is specified on the bending form either in the reinforcement schedule or on the bending list, D min is to be taken from the above table.

For reinforcing steel meshes and welded reinforcement that are bent after welding, DIN EN 1992-1-1, Table NA.8.1DE/1 must also be observed. The minimum values of the bending roll diameters listed above only apply if a = 4 x ø (= distance of the weld from the start of the bend).

Spacer Type and installation according to DBV leaflet "Spacers" and "Concrete cover and reinforcement"

Securing the top reinforcement according to DBV data sheet "Supports"

For component thicknesses up to approx. 30 cm, the DBV data sheet specifies the requirements for the supports and regulates their application.

The following basic Fct are permissible for supports certified in accordance with the DBV data sheet:

Linear supports: p (kd) = 0.67 kN/m

Point supports: p (kd) = 0.50 kN/Treistle

Maximum laying distance

Bar diameter ø of the top reinforcement	Linear supports
≤ 8,5 mm	a = 50 cm
8,5 mm < ø ≤12 mm	a = 70 cm
ø > 12 mm	a = 70 cm

Laying distance for linear supports: a = better no outer diameter

Bar diameter ø of the top reinforcement	Point supports
≤ 8,5 mm	a = 50 cm
8,5 mm < ø ≤12 mm	a = 70 cm
ø > 12 mm	a = 70 cm

Laying distance for point supports: a legibles in both directions

Plan basics

Implementation planning by BIM Architect BOA as of 01.02.2023