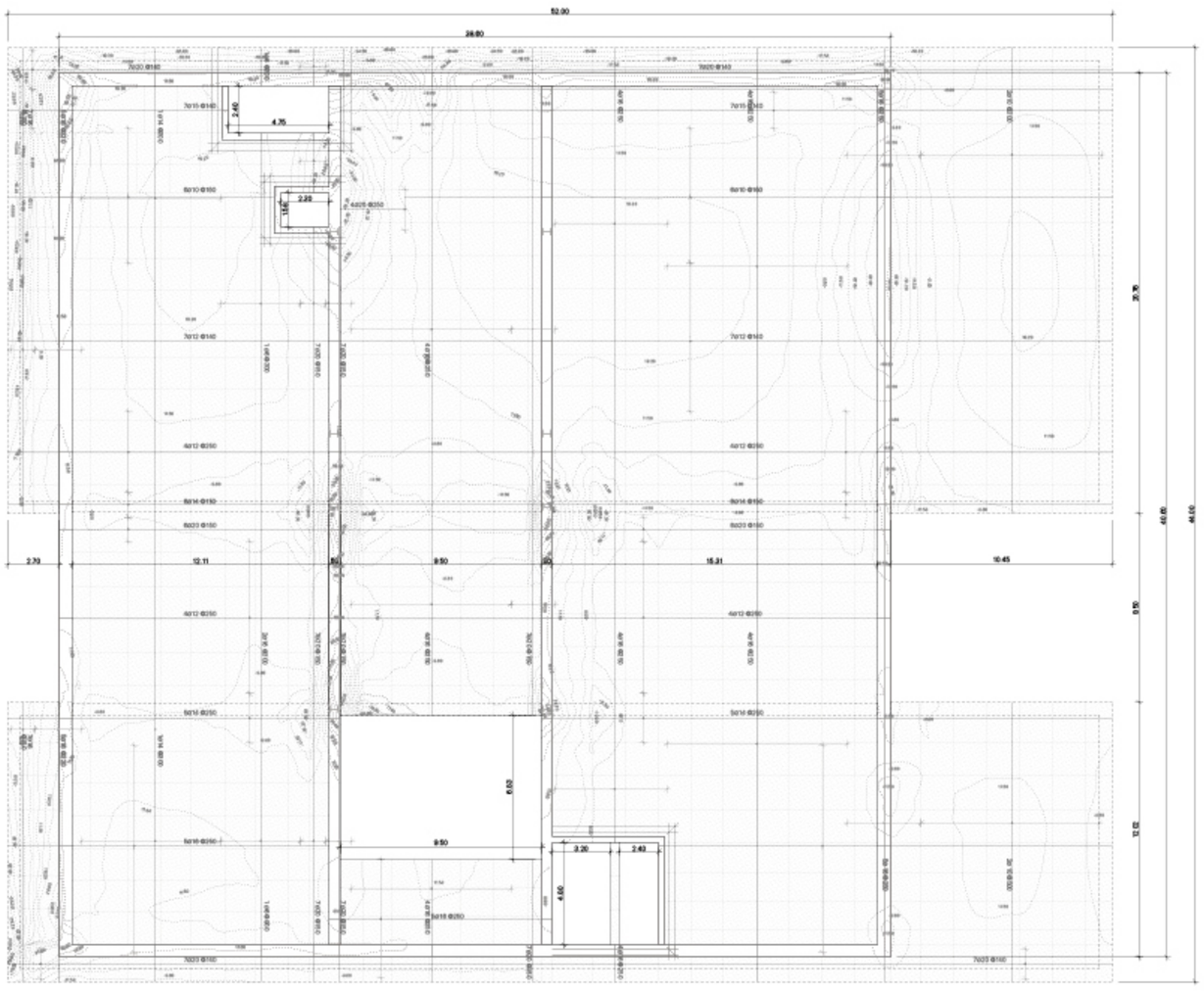
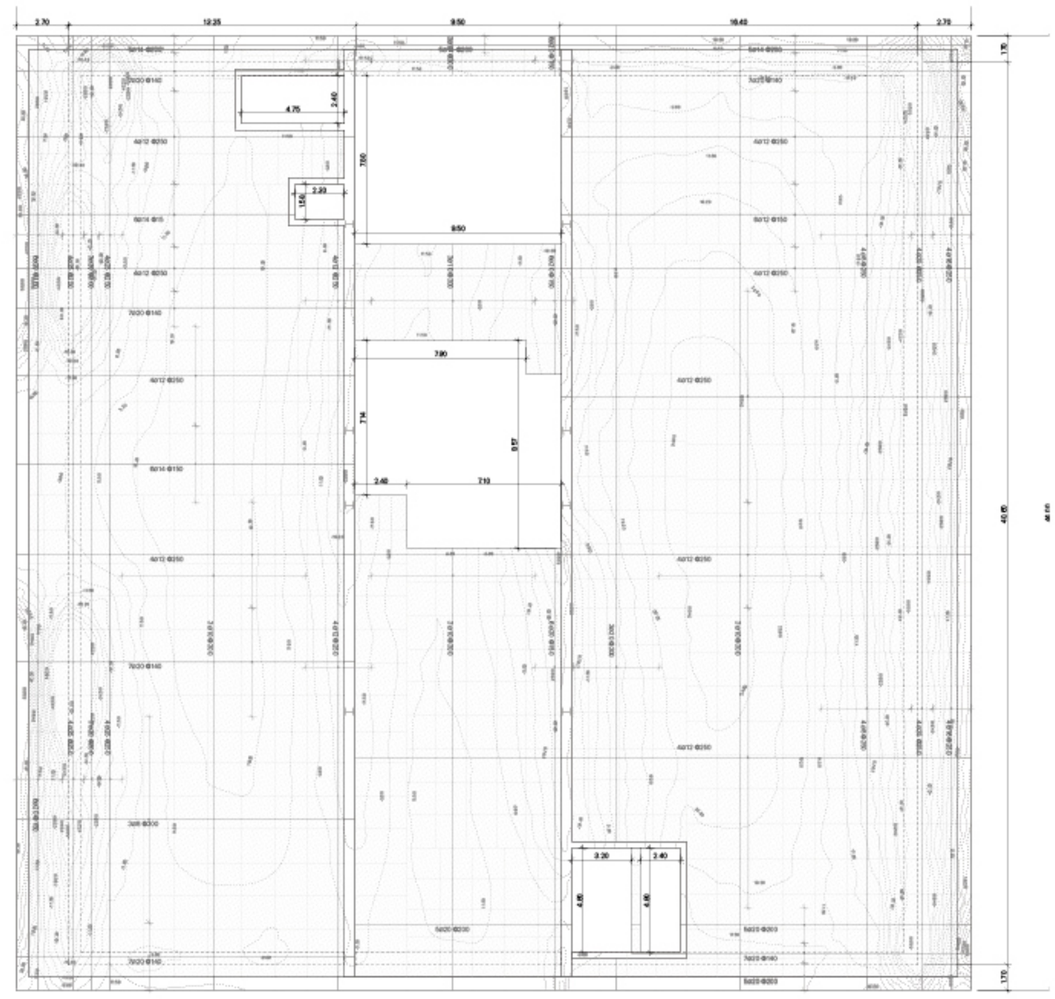
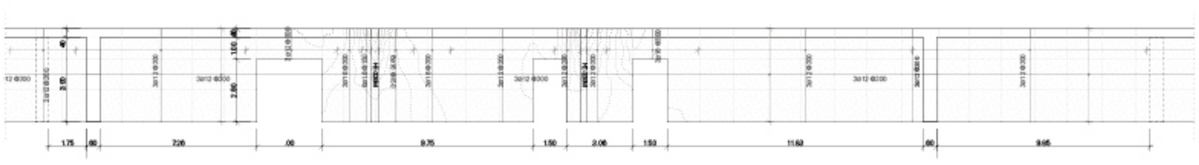


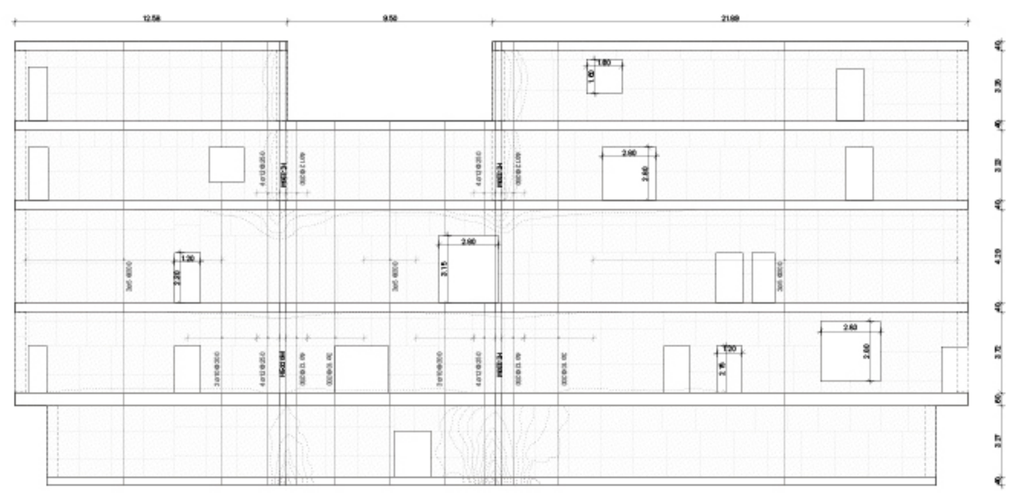
First Floor - M11 X axis
Pearls (concert chambre/blackbox) + Cantine
Longitudinal and transverse top rebars
±0.000



Ground floor - M11 X axis
Library + Mediateche + Bar + Club + Front office
Longitudinal and transverse top rebars
+3.900



Underground bearing walls - S12 vertical axis
Entrance to Club, rehearsal small rooms
Vertical and horizontal superficial rebars
-4.255



Central bearing walls - S12 vertical axis
Ground floor, 1st floor, 2nd floor, 3rd floor, 4th floor.
Vertical and horizontal superficial rebars

LOAD CASE DEFINITIONS

AREA SHELLS

Case	Type	InitialCond	DesignType	RunCase Yes/No	CaseStatus Tonf-s2/m
C_Dead	LinStatic	Zero	DEAD	Yes	Finished
MODAL	LinModal	Zero	OTHER	No	Not Run
C_use	LinStatic	Zero	LIVE	Yes	Finished
C_Wind X	LinStatic	Zero	WIND	Yes	Finished/-
C_Wind Y	LinStatic	Zero	WIND	Yes	Finished/-
Snow	LinStatic	Zero	SNOW	Yes	Finished

MATERIAL PROPERTIES

AREA SHELLS

Material	Fc Tonf/m2	LtWtConc Yes/No	FinalSlope	FAngle Degrees	DAngle Degrees
4000Psi	2812.28	No	-0.1	0	0
HA-40	4078.86	Yes	-0.1	0	0

AREA SECTION PROPERTIES

AREA SHELLS

Section	Material	AreaType	DrillDOF	TotalWt Tonf	TotalMass Tonf-s2/m
Bearing ceiling 300	HA-40	Shell+Frame	Yes	371	78.63
Bearing ceiling 400	HA-40	Shell	Yes	4018	817.00
Bearing ceiling 600	HA-40	Shell	Yes	289	47.87
Bearing wall 500	HA-40	Shell	Yes	3727	684.00
Bearing wall 400	HA-40	Shell	Yes	6983	814.00

MATERIAL PROPERTIES

REBAR DATA

Material	Fy Tonf/m2	Fu Tonf/m2	EffFy Tonf/m2	SHard	SSCurveOpt	FinalSlope
A615GR60	42184.18	632678.27	46402.6	0.01	Simple	-0.1
Rebar	5986.81	632678.27	46402.6	0.01	Simple	-0.1

REBAR DEFINITIONS

Horizontal rebars. Ceilings

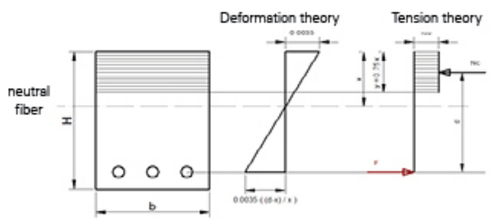
H=	100cm	M=	60mT	γA=	1.6
b=	40cm	fck=	25N/mm2	γc=	1.6
r=	5cm	fsk=	500N/mm2	γs=	1.15

M* =	75	7500000	Kgcm
fcd =	16.7	166.7	Kg/cm²
fsd =	435	4348	Kg/cm²

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

M* = F x d ----- > F = M*/d
d = H - r - y/2 ----- > F = M*/(H - r - y/2)
F = Nc = y x fcd x b ----- > ----- > ----- > y x fcd x b = M*/(H - r - y/2)
(fcd x b x (H-r))y - (fcd x b /2)y² = M*
(fcd x b /2)y² - (fcd x b x (H-r))y + M* = 0
Ay² - By + M* = 0



A = fcd x b /2 = 3333.3333
-B = -1 x fcd x b x (H-r) = -633333.33

y+ = 177.31 cm
y- = 12.69 cm

d = 88.66 cm
F = 84597.41 Kg

As= 19.46cm2

REBAR DEFINITIONS

Steel Values Tables.

SECCIONES EN cm² Y PESOS — CUALQUIER TIPO DE ACERO

Diámetro Ø (mm)	Peso g (kg/m)	NUMERO DE BARRAS 1	2	3	4	5	6	7	8	9
5	0,13	0,19	0,39	0,59	0,78	0,98	1,18	1,38	1,57	1,77
6	0,22	0,28	0,56	0,85	1,13	1,41	1,70	1,98	2,26	2,54
8	0,40	0,50	1,00	1,51	2,01	2,51	3,01	3,52	4,02	4,52
10	0,62	0,79	1,57	2,36	3,14	3,93	4,71	5,50	6,28	7,07
12	0,89	1,13	2,26	3,39	4,52	5,65	6,79	7,91	9,05	10,18
14	1,21	1,54	3,08	4,62	6,16	7,70	9,24	10,77	12,32	13,86
16	1,58	2,01	4,02	6,03	8,04	10,05	12,06	14,07	16,08	18,09
20	2,47	3,14	6,28	9,42	12,57	15,71	18,84	21,99	25,14	28,28
25	3,85	4,91	9,82	14,73	19,63	24,54	29,45	34,36	39,27	44,18
32	6,31	8,04	16,08	24,13	32,17	40,21	48,26	56,30	64,34	72,38
40	9,87	12,56	25,13	37,70	50,26	62,83	75,40	87,96	100,50	113,10

$U = A \cdot f_{yd}$ $U = A \cdot f_{yd}$ — f_{yd} (kp/cm²) = 2.200
CAPACIDAD MECANICA EN TONELADAS

Diámetro Ø (mm)	NUMERO DE BARRAS 1	2	3	4	5	6	7	8	9	10
5	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,01	3,38	3,76
6	0,54	1,08	1,62	2,16	2,70	3,25	3,79	4,33	4,87	5,41
8	0,96	1,92	2,88	3,85	4,81	5,77	6,73	7,69	8,65	9,62
10	1,50	3,01	4,51	6,01	7,51	9,02	10,52	12,02	13,52	15,03
12	2,16	4,33	6,49	8,65	10,82	12,98	15,15	17,31	19,47	21,64
14	2,94	5,89	8,83	11,78	14,72	17,67	20,61	23,56	26,50	29,45
16	3,85	7,69	11,54	15,39	19,23	23,08	26,92	30,77	34,62	38,46
20	6,01	12,02	18,03	24,04	30,05	36,06	42,07	48,08	54,09	60,10
25	9,39	18,78	28,17	37,56	46,95	56,34	65,73	75,13	84,52	93,91
32	15,39	30,77	46,16	61,54	76,93	92,31	107,70	123,09	138,47	153,86
40	24,04	48,08	72,12	96,16	120,20	144,24	168,28	192,32	216,36	240,40

Trabajo a tracción o compresión. – Calculada con $\gamma_s = 1,15$.

REBAR DEFINITIONS

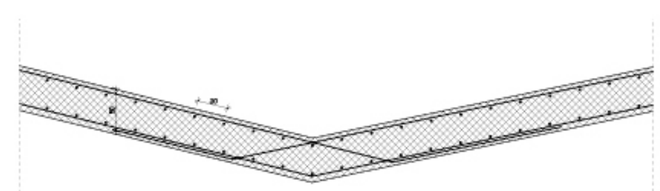
Vertical rebars. Bearing Walls

H=	100cm	N=	9.044	F22wall=	60T
e=	40cm	f'c=	40Mpa/1.6		
wall Area=	40cm2	f'y=	600Mpa/1.6		

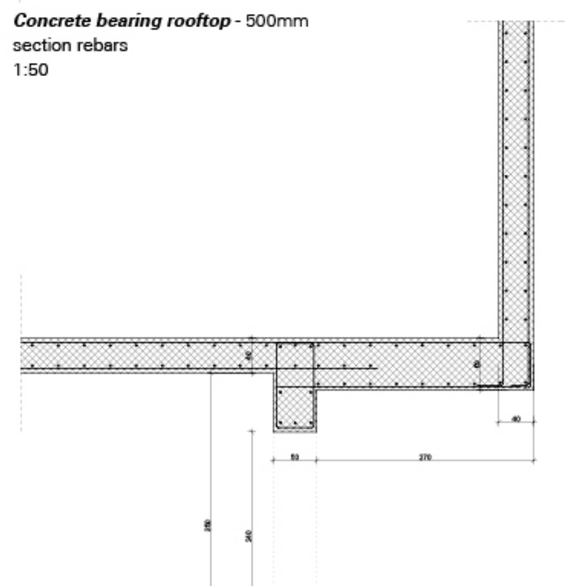
N = 0.85* Area * f'c
concrete section resistance

A necessary steel = (F22 -N concrete section resistance) / f'y

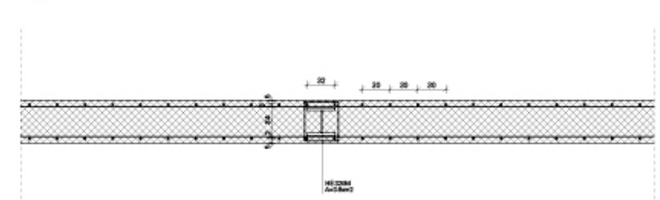
A necessary steel = As= 39.98cm2



Concrete bearing rooftop - 500mm
section rebars
1:50



Concrete bearing facade - 400-600mm
section rebars. Entrance cantilever
1:50



Concrete interior bearing walls - 500mm
plan rebars. HE profile pilar
1:50

APPLIED LOADS

Permanent Loads	KN/m2
Concrete bearing ceilings	8
Finisher pavement	0,6
Concrete Rooftop	5
Corrugated metal sheet	0,04
Interior partitions	1,2
Insulation 250 polystyrene	0,03
Usage Loads	
Roof mantainance	1.0
Blackbox + Concert hall	5.0
Classrooms / Offices	3.0
Storage + Backstage	5.0
Circulation Areas	5.0
Wind Loads	
Suction	0.5
Pressure	0.8
Snow Loads	
Zurich (408m)	0.50
Deformation flexion limit	
Vertical	1/600
Horizontal	1/600

HE320M

METAL PROFILE PROPERTIES

Dimensions	
Outside height (t3)	0,359
Top flange width (t2)	0,309
Top flange thickness (tf)	0,04
Web thickness (tw)	0,021
Bottom flange width (t2b)	0,309
Bottom flange thickness (tfb)	0,04
Section properties	
Cross-section (axial) area	0,0312
Torsional constant	1,506E-05
Moment of inertia about 3 axis	6,813E-04
Moment of inertia about 2 axis	1,971E-04
Shear area in 2 direction	7,539E-03
Shear area in 3 direction	0,0206
Modulus properties	
Section modulus about 3 axis	3,796E-03
Section modulus about 2 axis	1,276E-03
Plastic modulus about 3 axis	4,436E-03
Plastic modulus about 2 axis	1,951E-03
Radius of Gyration about 3 axis	0,1478
Radius of Gyration about 2 axis	0,0796